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R. S. STURTEVANT, Editor
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Japanese Irises at the Brooklyn Botanic Garden.

THE AMERICAN IRIS SOCIETY

ONE HUNDRED JAPANESE IRISES—MORE OR LESS

George M. Reed

The Japanese Iris has a garden value distinct from the other varieties of this group of plants. Their flowering period follows after the tall bearded and the slightly later, smaller beardless Iris such as *versicolor, pseudacorus* and *ochroleuca.* In the vicinity of New York the Japanese varieties may be expected to bloom the last few days of June and continue until August. The period for maximum bloom is, on the average, the first two weeks of July. The first varieties to blossom are usually the small-flowered single types, white or red-purple, while the latest are such kinds as Kuro-kumo and Oshokun.

The Japanese Irises thrive best at the waterside—along the edge of a pond or brook. Under such conditions they grow more vigorously and produce larger flowers. However, they succeed satisfactorily in the ordinary garden situation. In any case, they are best planted where one may look down on the open flowers.

There is endless confusion among the hundreds of named varieties. Although they have long been grown in Japan, they were first introduced into Europe about 1857. Since then, numerous varieties have been listed, only to disappear and be replaced by other names. Probably the larger number of varieties have been introduced from Japan at various times during the past seventy-five years. However, plants are readily raised from seed and consequently many named kinds have been developed in Europe and America.

Part of the confusion is due to the fact that the Japanese Iris forms seeds readily and new seedlings may be substituted for named plants. Further, plants received from Japan frequently are renamed by American and European growers. The descriptions are often very inadequate and consequently the identity of a particular plant cannot with certainty be determined.

The varieties vary greatly in height of flower stem, the size, shape and color of the flowers and, to some extent, in the date of

blooming. Most of these characteristics are greatly influenced by environment. Whenever grown in a moist situation the stems are much taller and the flowers larger. Among seedlings there is the greatest variation. Usually there is a preponderance of small, single-flowered types, either white or some shade of blue or red-purple. There are, however, to be found large-sized, single-flowered types and various kinds of doubles in many color combinations.

There is frequently a great similarity between named varieties. Okubanri is a large single-flowered plant which originated in Japan. The main color of the falls is white, with well-marked bluish-violet veins; the standards are reddish-purple, edged with white. This variety is almost duplicated by Galathee of Vilmorin and Beauty of Childs. There are slight differences in the shape and relative sizes of the floral parts, but the similarity between them is very close. In a similar fashion, there is but little difference between Shadow of Childs and Neptune of Vilmorin. The former is slightly larger and the color a little redder, but otherwise the resemblance is very close. Astarte of Vilmorin is a slightly smaller, less brilliantly colored duplicate of the Japanese Kuro-kumo. Pallas, Ondine, Morning

At the Brooklyn Botanic Garden.

Mists and Zama-no-mori form a group of similar varieties. They vary slightly in the intensity of the flush of lavender on the falls, or the edging of the standards. Helene and Proserpine are similar, as also are Idzumagawa and Melpomene.

It is interesting to note that singles and doubles may occur which, more or less, are counterparts of each other. Chameleon is essentially the double-flowered type of Mars. Idzumagawa stands in a similar relation to Okubanri and Fanny Hamlet Childs to Granite. Tatsuta-gawa, a single-flowered type with a broad band of white around the yellow zone and a margin of rosy-red, is paralleled by the double-flowered Choseiden and the triple-flowered Tenjo-no-kamuri. It is true, of course, that the color of the standards in the single-flowered types, as well as the color of the style branches, may give an entirely different garden effect to the single varieties as compared with the double.

Last year I published a preliminary scheme of classification for the Japanese Iris in the BULLETIN of the American Iris Society. This classification was based primarily upon the color of the falls. Seven groups were recognized and under each group single and double varieties were listed. In most of the groups a further distinction was made on the basis of whether the predominant color of the falls was blue or blue-purple or red-purple.

During the past year a much larger number of varieties have been studied and comparisons made for the purposes of classification and, in the main, the preliminary scheme of classification was found to hold in a fairly satisfactory manner. One obvious extension, however, proved to be necessary in the third class of the original scheme, which was described as the group of varieties in which a white zone occurred around the yellow blotch on the falls and white veins radiated outwards more or less to the margin. There are a number of varieties in which the white zone around the yellow blotch is lacking, although the white or light-colored veins stand out sharply. Reine Helene is a good example of this type among the blue-purples and Saru-odori and Iwato-no-hikari among the red-purples.

Class I includes the white-flowered varieties. White is a very common color in Japanese Iris plants, since in any collection of seedlings a large number of white-flowered individuals will appear. These differ greatly in size and shape of the floral parts and, although most of them are single, a few are double-flowered. Many

growers of Iris have selected and named white varieties. Hatsu-shimo, Snowbound, Venice and Tsuru-no-kegoromo are single white varieties. The latter possesses a much larger flower than the others and, further, the standards are longer, more horizontal, and show a connecting link with the double-flowered types. There are a few single white varieties which have standards showing a margin of lavender or pink and, in a few cases, Apollo, for example, the standards are more or less rose-purple in color. These stand out more clearly from the predominant run of single varieties. Among the

Photo by J. Oerts.

Varied forms of Japanese Irises.

double-flowered types, a few may be mentioned, such as Gekka-no-nami, Eucharis, Goldbound, White Wings, Shirataki and Bandai-no-nami. It is generally difficult to distinguish clearly between these named white varieties, but slight differences in shape and arrangement of parts, together with texture, may serve as points of distinction.

The varieties of Class II also are white in their garden effect. On inspection, however, they are found to have a slight flush of color between the veins. There is, however, a marked white zone around the yellow blotch, with broad white veins radiating outwards more or less completely to the margin. Among single-flowered varieties Morning Mists, Ondine, Zama-no-mori, Pallas and Priam may be mentioned. Morning Mists, Ondine and Pallas have white standards; Zama-no-mori has the lavender flushed falls and the standards have a narrow edging of pink. Priam is somewhat similar to Pallas, but somewhat more deeply colored. Mrs. George Stumpp stands out from the others in this group by the reddish-purple color of the standards, and bears a similar relation to the other varieties as Apollo does to the single whites.

The double-flowered types of this group are represented by Amano-gawa, Kumoma-no-sora, Zephyr and Hebe. These are somewhat similar, but Hebe is a smaller flowered plant and somewhat more deeply colored. The blue-lavender flushed varieties are fairly numerous, while there are relatively few of the pink or rosy-purple type. Painted Lady is an example; there is a distinct white zone with the white veins radiating to the margin; between the latter there is a flush of rosy-purple color; the standards and style branches are also slightly colored pink.

Class III is not sharply separated from the second. Most of the varieties show a distinct white zone around the yellow blotch with the white veins radiating outward to the margin. The color, however, is much deeper and more uniformly distributed between the veins extending to the margin; as noted above, in some varieties there is no white zone around the yellow blotch, but the color extends over the entire fall except for the radiating white or faintly tinted veins.

The single blue-purples are represented by America, Dominator, Kamata and Reine Helene. In America there is a broad white zone around the central yellow area; the style branches are white, with the crests tipped a light lavender-violet. Dominator has a much

narrower white zone and a deeper shade of blue-violet color; the standards are light, practically white at the center, with a colored margin; the style branches are also white with the tips and crests light violet. Kamata shows a still narrower white zone; the color is lighter than in Dominator or America; the standards have the white center with light bluish-violet at the margin; the style branches are also white with the margin and crests a bluish-violet. Reine Helene lacks the white zone around the yellow blotch; the veins are indistinct, pale bluish in color; the standards are more uniformly colored and the style branches are white with the crests tipped a shade of violet.

The blue-purple doubles include a large number of varieties. Azure is only slightly deeper colored than Pallas of Class II; the white zone is very broad, with broad veins running through the faintly colored margin. Crystal and Blue Jay are very similar, with deeper shades of bluish-violet. Kumo-no-obi is much more deeply tinted, with a broad band around the margin of the standards and falls. Amphitrite has a still narrower white zone around the central yellow blotch. Pyramid and Koki-no-iro are very similar, with a very narrow white zone and white or light colored veins extending only part-way to the margin.

The red-purple singles are represented by a large number of varieties. Tatsuta-gawa has a very narrow red-purple band to the falls, with a similar narrow fringe of color on the standards and on the tips of the style branches. Nausicaa has the white zone more narrowly restricted. In Saru-odori and Iwato-no-hikari there is practically no white zone and in both a bluish halo around the central blotch; the standards are more deeply colored in the latter variety. Kakujakuro is a larger flowered type with the white zone not clearly differentiated, and with a fringe of color on the standards and style branches. Red Ridinghood, Helen von Siebold and Datedogu are more deeply tinted than the other varieties. Red Ridinghood has a much broader white zone around the central blotch, which is entirely lacking in Helen von Siebold. In some illustrations, Datedogu has a rather distinct white zone with pale radiating veins. In other illustrations it is an entirely different Iris, belonging to the group in which the veins are deeply colored.

There are many red-purple double-flowered varieties in this group. Chadai has a very broad white zone, with only a fringe of color on the falls, standards and tips of the style branches; Cho-

seiden is very similar, but the band of color is slightly broader; Tenjo-no-kamuri is practically a triple form, closely resembling Choseiden in the color tints and their distribution. T. S. Ware has a much broader color zone, restricting the white area. This is carried out still further in Geishoui, in which the white zone is barely discernible. Miyako-dori is another representative of the group, standing somewhat between T. S. Ware and Geishoui. These last named varieties are darker in color than the others mentioned.

Class IV. The varieties in this group have a more or less white background with deeply colored veins but, to some extent, the pigment is distributed between the veins in the form of dots. In some of the varieties these small pigmented areas are very numerous, giving practically a solid color effect. However, most of them stand out rather distinctly from varieties of the next two groups.

The blue-purple singles are represented by such varieties as Okubanri, Galathee and Beauty. These are very similar, with very little color bteween the deep blue-violet veins; the standards are red-purple, edged with white. Proserpine and Wister's Favorite are much more pigmented between the veins, giving at a distance a bluish-violet effect.

The blue-purple singles are represented by such varieties as Manadzuru, Idzumigawa, Shii-no-yuki and Melpomene are more or less the double forms of types like Okubanri. These varieties can be distinguished by variations in the amount of pigment between the veins and the color of the style branches. La Favorite, Victor, Robert Craig and Helene are slightly more pigmented between the veins and usually have light tinted style branches. Sumidagawa and Matchless stand out as having very conspicuous blue-violet veins; there is also a distinct blue-violet halo around the yellow area in the latter. Warai-hotei is much darker in color and stands out sharply from the others by its intense dark violet-purple style branches and accessory petaloid structures.

The red-purple singles are represented by a series of varieties corresponding to those in the blue-purple group. Betty Jean Childs is very similar to Okubanri except that it is reddish-purple. Aoigata is characterized by a heavily pigmented zone around the yellow blotch, with red-purple standards. Masako's Mirror, Collingwood and Topaz form a series in which there is an increasing pigmentation between the veins, paralleling Wister's Favorite; they can also be distinguished by different shades of reddish-purple in the standards.

A number of double varieties are red-purple in color. Gyokuhoryo has pinkish veins which do not run clear to the margin; the color between the veins is also confined largely to the central area. In fact, the Iris would be a good example of the flushed pink type except for the deeply colored veins. Pluton, Ulyssee, Rish-no-tama, Hana-aoi, Tagota-no-tsuki and Rose Anna are other varieties belonging to this group. In general, there is an increase in the amount of pigment between the veins from Pluton through the others to Rose Anna. There are other points of difference between them which can be used to separate the one from the other. Pluton and Ulyssee are very similar except that Ulyssee is slightly more red-toned than Pluton. Rish-no-tama is the red-purple counterpart of Warai-hotei.

Class V. This group is characterized by deeply colored veins and has a uniform distribution of color between. The latter is in the lighter tints of lavender, lavender-pink, mauve and rose-purple. The veins usually stand out rather distinctly, although in a few varieties there is but little difference in the depth of color in the veins as compared with the areas between. The blue-lavender singles are represented by such varieties as Amethyst, Airship, Aspasie, Frances E. Cleveland, John Francis and Katherine Havemeyer. These differ considerably in the size and shape of the falls and standards, as well as in the particular tint of color.

Among the pinks, mauves and rose-purples there are a considerable number of varieties such as Pink Progress, Mirage, Quakeress, Isabelle, Dancing Nymph, Hagi-no-sato and Gyokuhoren. These differ in the tint of color, the pigmentation of the standards, and the presence and distribution of the bluish halo around the central yellow blotch. The doubles of this group are represented by Norma, First Love, Ganymede and Atlanta. Here again, the distinctions are largely those of tint.

Class VI. This class is similar to the preceding one. The colors, however, are the darker shades of blue-purple and red-purple and consequently the veins stand out less sharply as compared with the varieties in the previous group. All of the varieties with the darker shades of blue-purple and red-purple belong here.

Among the blue-purple singles may be mentioned such varieties as Oyodo, Violet Beauty, Paragon and Eumee. Oyodo and Violet Beauty are very similar in shade; they differ, however, quite strik-

ingly in the shape of the falls. In Violet Beauty they are longer and not overlapping, whereas in Oyodo they are broad, overlapping.

The double blue-purples are represented by Kuro-kumo, Astarte, Oshokun and Prince C. de Rohan. Astarte and Kuro-kumo are very similar. They differ from Oshokun in lacking the brilliancy of color in the latter, due to the presence of a halo around the yellow blotch. Prince C. de Rohan is less blue in effect than Oshokun.

The red-purple singles are represented by Otome-no-ude, Shadow, Neptune, Yedo-jiman and Nightfall. Otome-no-ude is very similar to the wild type, the flowers being small and rich red-purple in color. Shadow is very similar to this variety, except that the falls are much larger and Neptune is very similar to Shadow. In Yedo-jiman the tones are darker and the flower still larger. In Nightfall there are deeper shades of red-purple, larger falls and, further, an increase in the size of the standards, which also extend out somewhat horizontally instead of standing more or less erect.

The red-purple doubles are represented by a number of varieties. Taiheiraku has pale style branches and Mahogany is darker, with deeply colored style branches. Shishiikari is essentially the triple-flowered type of Taiheiraku. Tsurugi-no-mai is another variety with rather a deep shade of red-purple and dark bluish-purple style branches. Kuma-funjin carries us over closer to the blue-purple group.

Class VII includes the splashed or marbled types. Various tints and shades of blue or red-purple occur on the falls and standards. The varieties are usually rather distinct, but difficult to classify on the basis of color. Many of the varieties named after various brocades belong in this group. The lighter tints of blue-purple and red-purple are represented among the singles by such varieties as Mars, Confucius, Karyobinga and Yasen-no-sakura. The doubles are represented by such varieties as Chameleon, Iso-no-nami, Senjo-no-hora, Momiji-no-taki, Ezo-nishiki, Fuji-musume and Sofuren. The darker shades among the singles are represented by Granite, Royal Robe and Tomoe. Fanny Hamlet Childs is essentially a double Granite; Thunderstorm is very similar, but more blue in tone, while Templeton is a redder toned type. Nanakomachi is another distinct blotched type, more or less similar to the ones already named.

THE SIGNIFICANCE OF JAPANESE NAMES FOR IRIS

AGNES L. REED

The Japanese, above all other races, deeply love and revere nature. It is not the awe-inspiring aspects so much as the sheer loveliness and the symbolic beauty of nature about them that appeals so strongly to this poetic people. Their literature is filled with those intangible qualities of plant or stone, of water or mountain, which all nature-lovers recognize, however vaguely. To the Japanese, the red blossoms of the azalea are the "fires of the gods"—the white snows of Fuji-yama the "garments of divine beings." The rivers with their frequent cascades, the significant arrangement of the stones in their gardens—all nature in picturesque Japan seems to have a conscious relationship to man. So, when the Japanese come to give names to the flowers, their most loved of nature's gifts, they turn to the world about them or to their ever-living myths for a comparison. The hundreds of Japanese Iris names, if we take the trouble to translate them, suggest objects of beauty, heroic deeds or persons and customs or myths.

Shobu, the sweet flag of Japan, with its sword-like leaves, from earliest times has been used as a plant of good omen. Its fragrant leaves are put into the bath and hung in the temples and houses. Then Hana-shobu, the flowering flag, or *Iris kaempferi,* came to be used also in the same way. At the Boys' Festival, or the Feast of the Flags, on the fifth day of the fifth month (June fifth according to the old Japanese calendar) Shobu and Hana-shoba are hung at the eaves of the houses, put in the public baths and in the rice wine or sake. The custom of using both plants has caused some needless confusion in the names. This is due largely to their similarity, particularly with reference to their leaves and to their habitat.

The flowers of Japan are regarded as poetic symbols worthy of special festival days. When the cherries bloom all Japan pauses to celebrate. At Yoshino near Kyoto and in Uyeno Park, Tokyo, especially, the cherry trees are famous for their beauty. However, these trees are found in nearly every park and garden throughout Japan. Their white or pink or red blossoms make April a delightful month.

The wisterias at Kameido near Tokyo and the azaleas near Nikko and in Hibiya Park, Tokyo, are exceedingly beautiful and fete days

are held for their viewing. June is the time of the Iris festival and thousands visit the wonderful Iris gardens at Horikiri and Kamata and other places, returning again and again to enjoy the succession of blooms. In the fall the glowing maples can be seen almost everywhere. Kyoto and Nikko are especially famed, but the hillsides and cascades of rivers show their vivid colorings in natural settings. In November the fetes of the chrysanthemum are held. The flower of the Imperial crest is cultivated carefully, from the smallest varieties to those of extraordinary size. The sixteen-petaled chrysanthemum is the national emblem of Japan.

Many varieties of Iris have received their names from those of other flowers. The cherry (Sakura) has given its name to several: Hinode-sakura, Cherryblossoms at Sunrise; Gosho-sakura, Cherries of the Imperial Palace; Sakura-gawa, Cherry Stream; Yasen-no-sakura, Cherry Blossoms Amidst Field Warfare; Yomo-sakura, Cherry Blossoms in Every Direction. The name of the maple (Momiji) has also been applied to at least two varieties: Momiji-no-taki, Maple Cascade, suggests an Iris with the autumnal crimson of these trees, and Momiji-no-nishiki a richly colored brocade. Fuji-musume, Daughter of Wisteria, is a delightful lavender colored variety. Kiritsubo, Paulownia Compartment, has the light purple or lavender of the Paulownia flower and is the name of one of the principal characters in The Tale of Genji. Gyokuhoren, Jeweled Lotus, is a lotus-shaped Iris with the rose color of the lotus blossom. Other Iris names belonging more or less to flowers include Shuchukwa, Flower in Wine, referring to an ancient custom of dropping flower petals in the wine cup. Hana-dori, Flower Bird, and Aoigata, Crest of Hollyhock Blossom, indicate form rather than color.

Japan's sacred mountain, Fuji-yama, is renowned throughout the world for its unparalleled beauty. Standing almost isolated, protecting Fuji guides the sailor far out at sea to his harbor, and from thirteen provinces the mountain with its ever-changing charms is visible. Cloud circled and snow crowned, it is presided over by the Goddess Sengen, who makes the flowers and the trees to bloom. This mountain has sponsored a number of delicately shaded Iris varieties: Fuji-no-rei, Spirit of Fuji-yama; Fuji-no-yuki, Fuji Snowcap; Fuji-no-mime, Unparalleled Beauty of Fuji, and Tago-no-Fuji, Mt. Fuji viewed from Tago Bay.

The waves (Nami) of the ocean so near at hand, the rivers (Gawa), the waterfalls (Taki), and the changing skies (Sora), fur-

nish names to many varieties. Gekka-no-nami, Surf in the Moonlight; Iso-uchi-nami, Shore Tossing Waves; Shira-nami, White Waves; Bandai-no-nami, Everlasting Waves; Maye-no-shiranami, Dancing White Waves, have white blossoms as one would expect, while Asahi-no-nami, Waves of The Rising Sun; Oki-no-nami, Waves in the Open Sea; Shiga-no-uranami, Breakers at Shiga Bay; Asagire, Morning Mists; Asagasumi, Morning Haze; Idzumi-gawa, Fountain Brook; Ama-no-gawa, Milky Way or River of Heaven, have delicate shades or colored veins. Other Irises, as indicated by their names, have a much richer color: Irihi-no-nada, Setting Sun on the Ocean; Bashu-no-ten, Serene Sky of Autumn, and Momiji-no-taki, Maple Cascade. To many of the dark red and blue-purple varieties names of clouds (Kumo) are given: Kuro-kumo, Dark Clouds; Kumo-no-isho, Dress of Cloud; Kumo-no-obi, Sash-like Clouds, and Kumoma-no-sora, Sky Between the Clouds.

Tsuki, the moon, rules the night as Ama-tersu, the Sun Goddess, does the day and from O'Tsuki-sama, Honorable Moon, we have several names for Iris varieties: Kojo-no-tsuki, Moon Reflected on the Lake; Kumoma-no-tsuki, Moon Between Clouds; Moro-no-tsuki, Moon in Mists; Kamimado-no-tsuki, Moon Over Paper Screen Window, and Shimoyo-no-tsuki, Moon in the Frosty Night.

Akashi has been noted from earliest times for its lovely views, and Suma Beach, a short distance west along the shore from Akashi, has a similar charm. Both have always been the theme of Japanese poets and are mentioned in "The Tale of Genji" as the place of the Prince's exile. Doubtless because of their beauty and fame we find several Irises with such names as Akashi, Akashi Inlet; Akashi-gata, Akashi Harbor; Akashi-no-ue, Akashi Shore; Suma-no-tsuki, Moon at Seaside of Suma, and Suma-no-nama, Beach of Suma.

The pine tree (Matsu) with its evergreen foliage and its appearance of unfailing vigor is to the Japanese a symbol of longevity. An Iris takes its name Matsu-shima, Pine-tree Island, from one of the three famous sights of Japan. Several hundred small islands comprise the group, many of which are covered with pines, often growing in grotesque shapes. The pine is commemorated in other Iris names such as Matsugae, Bough of Pine Tree; Matsu-no-sakae, Prosperous Pine; Matsu-kasa, Pine Umbrella, and Matsuba-gasane, Pile of Pine Leaves.

Many Iris names are purely descriptive; for example, Aifukurin, Blue Trimming, suggests an Iris with a blue band of color on the

margin of the falls. In a similar way Aka-fukurin, Red Border, is an Iris with a rose colored band of color on the falls. Similar descriptive names are: Fuji-botan, Wisteria Peony; Kyo-kanoko, Dappled Silk; Niji-no-tomoe, Whirled Rainbow; Kosui-no-iro, Color of the Lake; Koki-no-iro, Unusual Color; Hatsu-shimo, First Frost; Edo-murasaki, Yedo Violet; Fuka-murasaki, Deep Purple; Haru-no-akebono, Dawn in the Springtime; En-yo-no-ten, Glow of Sky, and Irihigata, After-glow.

Many animals and birds about which legends have arisen contribute to Iris names: Hosu, Young Phoenix; Ho-o-jo, Phoenix Castle, and Hoshun, Gallant Phoenix, are named for the mythical Howo bird. The long-lived crane, the favorite bird of the Japanese, is recognized in such names as Manadzuru, White-naped Crane; Chitose-dzuru, Thousand Year Old Crane, and Chiyo-no-tsurtu, Immortal Crane. Karyobinga, Celestial Bird, is another name applied to an Iris. This heavenly bird from the land of the blessed with the face of a beautiful woman and a wondrous song gives her name to a lovely single Iris, white with pink veins and dots.

A long list of animal names has been used for the Iris: Kuma-funjin, Excited Bear; Kuma-asobi, Frolicing Bear; Shishi-ikari, Angry Lion; Usagi-no-iro, Color of Rabbit, and Kuroi-cho, Dark Butterfly. The Iris named Akitsushima, Dragonfly Island, also recalls an ancient and poetical name of Japan. According to one version, the Emperor Jimmu Tenno, about 660 A. D., seeing a map of empire, compared it to a dragonfly.

Brocades (Nishiki) are the richest of Japanese fabrics. They are used for elaborate costumes, for court dances, and for palace hangings, and their various colors and patterns give names to many Iris whose blotched or flecked petals suggest a brocade to the imaginative Japanese flower grower. Shokko-nishiki, Chinese Brocade; Koku-ryo-nishiki, Brocade Like a Black Dragon; Ryoden-nishiki, Brocade of the Dragon Field; Karaori-no-nishiki, Chinese Woven Brocade, and Momiji-no-nishiki, Maple Brocade, are examples of such varieties. Juni-hitoe, Court Gown, belongs with the brocade names, for the old ceremonial court costumes were of rarest brocades and delicate silks.

The Japanese have many ceremonial dances (Mai and Kagura) which the gorgeous colors and dignified swaying of the Iris blooms naturally suggest. An Iris bears the name Gosetsu-no-mai, Dance of Gosetsu. This is a beautiful court dance given in November by

five girls of high birth. The costumes are of richest brocades and the dance is most elaborate. The doubling, almost tripling, of a rose-flushed Iris rightly belongs with such gorgeous costumes. Tai-heiraku, Enjoying Peace, is an Iris named for a classic dance performed only on important, happy occasions, as at the recent enthronement ceremonies of the present Emperor. Tsurugi-no-mai, Sword Dance, is another courtly military dance, whose name is given to a large, double, red-purple Iris. The dance is dedicated to Yamato-take, one of the pre-historic heroes of the Japanese. The sword, of which a copy is used in the dance, forms one of the Imperial regalia of Japan. The dance is intended to teach in practical form the lesson of how the divine ancestors fought for and conquered the land for their descendants. The name Asa-kagura, Morning Shinto Dance, comes from a solemn ceremonial dance of the Shinto religion. Another Iris, Ho-o-no-mai, Phoenix Dance, is named for a court dance representing the immortal Phoenix or Howo of Japan. This fabulous Emperor of Birds has feathers of five colors representing the five cardinal virtues of fidelity, obedience, justice, virtue and benevolence. Its tail is graduated like Pandean pipes and its song resembles the music of that instrument, having five mellow notes. It is a favorite decoration for musical instruments and is also used in brocade patterns.

Some dances are comic and farcial and are given at festivals and country fetes. Shishi-odori, The Lion Dance, is such a one given by two men in a lion's mask large enough to cover the heads of both dancers. The Iris so named is very large and many-petaled. Saru-odori, Monkey Dance, and Tori-odori, Tiger Dance, have similar interpretations and give their names to Iris varieties.

An Iris is named for Murasaki-shikibu, Lady Violet, a famous poetess of Japan, and most celebrated as the greatest Japanese novelist. Her story, "The Tale of Genji," comprises fifty-four parts and, written before 1015 A. D., is the greatest novel of the East and a graphic picture of the court life of that time. A whole calendar of court ceremonies might be compiled from it. In this story the Iris, among other plants, is frequently mentioned.

Datedogu, Extravagant Display, takes its name from Date-masamune, the powerful Daimyo of Sendai, who was on the side of Ieyasu in the founding of the Tokugawa Shogunate in the early part of the seventeenth century. He was very wealthy and had a large number of retainers, who were fond of keeping abreast of the

latest fashions. Extravagance in display was an outstanding characteristic. The name Date has come to stand, for the Japanese, for extravagance in fashion and mode of living; thus Datedogu, the tools or implements of Date, is applied to a single-flowered Iris of a vivid, red-purple color.

The Iris Masako-kagami, Masako's Mirror, is named for the beautiful Masako. She had a hand mirror, much coveted by her younger sister. This younger sister had a vivid romantic dream of a prince who visited and courted her. She related it to Masako, who offered to trade her mirror for the dream. In a short time the prince charming really did come, and it was Masako who received his attentions and later was wedded to him. The prince turned out to be Yoritomo who, about 1190 A. D., became the first Shogun of Japan, and the Lady Masako proved to be one of the most outstanding women of her country, exerting her influence for the good of the people.

The myths and legends of Japan are symbolical, their poetic significance seeming to belong to the Iris, whose beginning is a mystery and whose every blossom is a miracle. A few myths which are also Iris names will illustrate their fitness.

Iwato-no-hikari, Gleams from Iwato, a handsome rose and white Iris, is from the legend of Ama-terasu, the Sun Goddess who, in anger, shut herself away in a cave and left the world in darkness. The myriads of gods and goddesses gathered about the cave to plead for the Sun Goddess to come out and light the world again. They put the precious jewels on the upper branches of the sacred Sakaki tree and on the middle branch hung a mirror welded from the stars. Then Uzume, the Goddess of Mirth, danced most extravagantly until the whole company roared with laughter. The Sun Goddess was filled with curiosity and peeped out to see what was going on. Observing her face in the mirror, she stepped out to learn who her beautiful rival was. The gods quickly hung a straw rope across the cave entrance and prevented her return, and once more the world was light.

There are many myths of supernatural animals and birds. Dragons may be beneficent as well as evil. They are supposed to inhabit the waters and the dark recesses of the earth. Gyo-kuhoryo, Jewel Dragon, is one of the happiest of the myths and is commemorated in an Iris of rose quartz and sea foam color. This Iris stands for the gift of the Sea Dragon of the tide jewels to the

Empress Jingo, who ruled about 200 A. D. The jewels enabled the Empress to control the ebbtide and the floodtide. At this time the Japanese were engaged in a war with the Koreans and as the Empress, who commanded her fleet personally, neared the Korean shore, she dropped the ebbtide jewel and the waters receded so that the attacking Koreans rushed over the sands toward the Japanese fleet. Many were slain by the arrows of the warriors but, when the Koreans were near the ships, the Empress Jingo dropped the floodtide jewel and a mighty wave rolled over the Korean army and destroyed it. The Japanese took the rich Korean land and the jewels drifted back to the Sea Dragon's home.

Tatsuta-gawa, Autumnal Brocade Stream, is an Iris name associated with Lady Tatsuta, who may have woven the wine-red about the edges of its petals. Tatsuta is the lady who weaves the brocade of autumnal leaves. She is the counterpart of Sengen, the Goddess of Fuji-yama, who makes the trees to bloom. Tatsuta River is west of Nara and its banks are covered with the maples, which show their rich tints in the autumn.

One of the best blue and purple double Irises is named for Warai-hotei, The Smiling God of Fortune. He is the Saint Nicholas of Japan, beloved by all, especially the children, to whom he is supposed to give presents from his great bag. Warai-hotei is one of the seven Gods of fortune, or rather, six Gods and one Goddess, who are so much portrayed in Japanese art. Many times they are pictured in a boat—Takara-bune, Treasure Ship—which brings gifts and good luck to all. This name, as well as Shichi-fuku-jin, The Seven Gods of Good Fortune, has been applied to Iris plants.

Firefly hunting was the amusement of the court in ancient days and thousands still visit Uji every year on the night of the twentieth of the fourth month (May twentieth of the old Japanese calendar) to watch the firefly battle. Thousands of these insects are taken in tiny cages and set free along the Uji river. There, with myriads of others, they flit and flash like bright jewels while, from the shores and in boats, the enchanting spectacle is watched. There is a legend that these fireflies are the ghosts of old warriors of opposing clans and on this night they fight over again the ancient battles. For these insects, symbols of heroic days, these "fire flowers" as they seem, many iridescent Iris are named: Uji-no-hotari, Fireflies at Uji; Uji-no-kawagiri, River Mist at Uji, and Uji-no-hanazono, Floral Garden of Uji, are some of them.

From Japanese stories a number of names for Hana-shobu are obtained. Oshokun recalls the story of a Chinese girl of great beauty. Her fame reached the Emperor, who sent an artist to paint her picture for his inspection. The artist tried to extort money from the parents of Oshokun but they were poor and could give him nothing, so the artist made a picture of such ugliness that the Emperor lost all interest. One day, however, he saw the beautiful girl and on inquiry found out that the artist had deceived him. The latter was compelled to flee in order to save his life. He went to the court of the Mongolian enemy of the Emperor and showed to its ruler the true picture of the beautiful Oshokun. The Mongolian assembled a large army and invaded China, consenting to retreat only on condition that the girl be given to him. Oshokun, rather than leave her native land, threw herself into the river and was drowned.

The story of Tsuru-no-kegoromo, Robe of Feather, has been used in the naming of an Iris. Once in the early spring, when the blue sea danced and the birds sang, a poor fisherman chanced to see a beautiful robe of feathers hanging on a pine tree. As he was about to take down the robe, he saw coming from the sea a lovely maiden who asked that the robe be given to her, since it belonged to her, and without it she could never return to her celestial home. At first the fisherman refused to give up so rare a treasure but at her pleading he finally agreed to restore the feather robe if the maiden would dance for him the celestial dance. "I will dance the dance that makes the Palace of the Moon turn round, but I must have my feather robe," pleaded the moon-maiden. When she had put on the garment she struck her musical instrument and began to dance with strange, heavenly movements. Soon she rose into the air, playing and singing, until her song was lost in the upper regions beyond the clouds, but an Iris of that name is with us every summer.

Acknowledgments

I am indebted to several sources for the information concerning the significance of the Japanese Iris names. The translations in the early check lists of the American Iris Society have served as a starting-point. Through the courtesy of Mrs. Willard C. Brinton there was placed at my disposal a translation by Mr. Robert Kamide of the varieties listed in the book of Miyoshi—"Iris laevigata." Mr. Kamide also assisted with the translation of names from other sources. Above all I am indebted to Mr. Bunkio Matsuki, Columbia University, who has gone over the entire list of more than seven hundred names and given the correct spelling and new meanings. His aid has been of the greatest value in making clear the significance that lies back of the names applied to the varieties.

GARDEN IRISES—RATINGS

Chas. E. F. Gersdorff

Our second Symposium clearly shows that an evaluation of our Garden Irises according to our present Score Card leaves much to be desired. Frankly a fairer rating may never be obtained by its use, hence much injustice falls to the lot of the many smaller flowering, lower growing varieties and dwarfs, many of which are deserving of higher ratings for their garden value. The present Score Card has a tendency to influence the judgment of the scorer. These influences occur in connection with the consideration of points to be allowed for height, form and size, and under outstanding quality for value for exhibition or cut-flower purposes. Why penalize a garden Iris if it lacks the last two qualities? By lowering the percentage points for these, or changing the definitions of the quality to be rated, or eliminating in certain instances, I have arrived at a Score Card which when used will result in better ratings for the Real Garden Irises, and a lowering of ratings on those gorgeous things in our Exhibitions, which all to often are worthless or nearly so in our Gardens, owing to non-resistance to adverse weather conditions, lack of hardiness and other defects which do not affect their value for exhibition purposes.

Unless steps are taken to correct these faults in our Score Card, many real garden gems will be lost to us, inasmuch as the trend in new varieties nowadays is toward the Exhibition type almost exclusively.

There are three qualities deserving of most emphasis for garden value—plant, color and substance. Under Plant I make no change —20%. Under stalks, I have eliminated height entirely as this is to be considered in connection with Poise for which I am allowing 10%: the flowers pleasingly proportioned in size and form to the height and branching of the stalk. The evaluation of height is undesirable as a separate quality for it is here that the lower growing varieties suffer in their ratings, as well as in consideration of size and form according to conditions stated thereunder (present Score Card).

The Flower should have 55% distributed as follows: Color 20%: 10% for its carrying quality and 10% for its effect en-masse. Form

counts least of all in garden value, hence 5% is sufficient, and no examples of form should be noted. Size has really only value in its relation to the height of the stalk, and should only be considered from the standpoint of balance (not according to exampled varieties). 10% is sufficient here. Substance is of prime importance: 20%. This does not necessarily mean thickness of petals, but surface texture and durability.

Outstanding Quality is to remain unchanged at 15%, except that the specifications only include the following: Fragrance not over 5%, enduring foliage not over 5%, exceptional development in color, or substance, or distinctiveness, 5% for either, or collectively.

The Proposed Garden Type Score Card

Plant 20%.	
Growth exceedingly strong and vigorous	10%
Effect in garden and duration of bloom	10%
Stalk 10%.	
Poise: the flowers pleasingly proportioned in size and form to the height and branching of the stalk	10%
Flower 55%.	
Color 20%:	
Its carrying quality	10%
Its effect en-masse	10%
Form: if distinctive and pleasing	5%
Size: well balanced in respect to height of stalk	10%
Substance: firm and resistant to weather conditions	20%
Outstanding Quality 15%.	
Distribution: fragrance, not over	5%
Foliage throughout the season	5%
Exceptional development of color, or substance, or distinctiveness, not over 5% for either, or collectively	5%
	100%

I will not say this is the perfect Score Card for Garden Irises, but believe it would lead to more equitable ratings than the one now in use. It's at least worth a try-out. I am willing to see it bettered.

Here are two examples showing the use of both Cards on the variety Dr. Bernice. As a garden Iris I have always thought the rating of 73 too low for this one.

NOTE: For a discussion of the above see Tid-bits.—Ed.

According to Original Card:	
Plant:	
Growth	10
Effect, duration	10
Stalk:	
Poise	8
Height (examples)	7
Flower:	
Color	15
Form (examples)	5
Size (examples)	5
Substance	10
Outstanding Quality:	
Fragrance	2
Rating	72

According to the New Card:	
Plant:	
Growth	10
Effect, duration	10
Stalk:	
Poise	8
Flower:	
Color:	
Carrying quality	10
En-masse	10
Form	3
Size; well balanced in respect to height	7
Substance	20
Outstanding Quality:	
Fragrance	2
Rating	80

The Symposium rating for Garden value is 73.

PLANTING IRISES IN THE SOUTH

Willa Griffin Largent

Northern gardeners have a decided advantage over gardeners of the south. There's so much north and so little south, and cultural directions for one are not practical for the other in many instances. Even Little Rock and Louisville, where we find the southernmost nurseries of size, seem "away up north" to the gardeners below latitude thirty-two. The most important nurseries are located in the north and their cultural directions given are best suited for their localities and cannot be followed literally in the south. Especially do we find this so in the planting and culture of irises.

"Plant iris like a duck swimming in water and forget about them. Your reward will be a veritable paradise of bloom," is the promise one grower assures. Humph! It would tear my soul to have to inspect an iris planting in my part of the world a year after it was set under those directions. In the vast territory above thirty-two, doubtless you may follow such planting advice with a measure of success, but south of this you've got to "watch your step."

Firstly, there is the planting season that you must take into consideration. Most iris growers have their shipping season through

July, August and September, and some few through October, laying great stress upon the advantages of early July plantings. From several years' experience and the disheartening failures of planting in July and August, I find this is not the logical time to plant irises in the south. When the northern gardens are aglow with blooms, we, of the south, are nearing the time to harvest our seeds, our season of drouth (and Texas is par excellence when it comes to dry weather) is at hand. There is only one thing that will coax Jupiter Pluvius out, and I guess, all things considered, he must be right. Let him hear of a Fourth of July picnic, be it ever so small, and the odds are he will interfere. Even if he does so at this time, your newly planted iris will scarcely be benefitted. The ground dries rapidly, but hot, moist soil isn't conducive to vigorous growth in newly planted iris, to say the least. On the contrary, it reduces them to a state of exhaustion and often to a pulpy mass. You may make temporary shades by using four stakes over which a bit of old cloth is stretched, and it will help considerably if it should or shouldn't rain. If you water them as they seem to demand, you must inspect them daily, stirring the dirt often to be sure the humidity has not overcome their constitution weakened from the transplanting. Other plants need watering and seem most grateful for it, and I've a notion the iris would be too, if we could find means to counteract the intense heat combined with moisture.

It's an easy matter to transplant iris from one portion of the garden to another after the blooming season, which, in my garden, is rarely after the first of June. To begin with, the heated, dry season has hardly begun and there's not the shock to plant life a plant experiences if its toes are cut off and likewise its head, let alone the travel in a stuffy wrapping carton. Most often you do not break the dirt from the tiny rootlets, so they can easily survive a move. But what chance has a poor iris with top and root system seriously disturbed, as is absolutely necessary in shipping, to send out new roots in environments of a southern drouth?

My very first order was planted about the tenth of September. I readily recall the task of pulverizing the hard soil. The nights were getting pleasant and rains soon came, so I lost very few plants. The next spring they bloomed well and I immediately became an iris fan. My next few orders were for very inexpensive varieties and came, as the growers advised, in early July. They were promptly set in the ground, but by the first of September they had

all died from rot. The next July I re-ordered and again in August I had a nice order to plant. The first of September found these orders had succumbed to rot, not that I didn't try to combat it—I used sulphur, I used corrosive sublimate and plaster of Paris—used it on the well plants and the sick—stirred the ground well and exposed the rhizomes to the sun, but could not save my plantings. The loss was felt most keenly when I ordered a dozen plants like Shekinah, Lord of June, Crusader and others when they were priced much higher than they now are. But once you start with iris you never stop until your money gives out.

An order went to an iris breeder who promptly ackowledged same and advised that it would be filled the early part of September because, it was explained, the buds for the coming season would be formed and I would be surer of blooms. Bless her thoughtful heart! It was the solution of all my troubles with planting iris. The plants came, and in the face of our balmy fall weather which usually has its beginning in a copious rain, they immediately sent out new roots and new rhizomes as well, and were a joy to behold at blooming time. Subsequent orders were sent out for October delivery. I know the growers are sometimes provoked at the audacity of the lateness of some of my orders, but I am governed largely by weather conditions, our fall rains having no specific date for their appearance, and sometimes they are not sufficient when they do come to justify even early September planting, hence the last minute orders. I know, beyond a doubt, fall is the proper planting time for iris in the south. There may be times when you will be lucky and your plants live—I've yet to record such luck—but taking it year in and year out you'll lose heavily on July and August plantings.

Spring plantings bring no satisfactions. The plant has no serious handicaps to overcome, but the transfer always stunts the bloom, so you wish for a whole year you had ordered some other varieties. Of course, we southern gardeners must do one of two things, i.e., book our orders for future shipments or risk the growers being sold out of the plants we had set our hearts on obtaining. This latter goes a bit hard, especially with the division of feminine clientele who are not good sports. So, unless you can fortify yourself against the disappointments, I strongly advise the first.

Do not (let me implore those making out their first order for iris) content yourselves with the old so-called standard sorts such

as you see advertised for beginners. Of a surety there are a few old varieties no garden need be ashamed of, and no matter how large your collection will eventually be, you will still want them, but they can be counted on your fingers. Start out with five or six of the newer but moderately priced varieties and add to them still better ones. You will never regret the additional outlay in money, but if you choose such varieties as Albert Victor, Mad Chereau, Canary Bird, etc., you will not rest until you grow the better varieties, finally discarding the older ones, so, why not do at first the thing you are bound to do in the end?

It is hardly worth while to begin naming a list. Quite naturally there are some varieties that are poor growers in the north that are vigorous in the south. Color taste and time of bloom should enter largely into your selection.

But order iris by all means, whether late or early, wisely or indiscriminately, and when the marvelous blossoms unfold, pluck one, look into its heart, get your pad and pencil and write down in words the description of its fragile beauty and glorious, wondrous colors. My word for it, you will use the self-same pad and pencil to write names of newer and better irises you just must grow in your garden the coming year.

Iris reticulata. This earliest of bulbous irises (at least in northern gardens) is often found as a happy colonist in really old gardens. Its blue-purple tones appear even in March in New England and combine strikingly with the vivid yellow of Winter Aconite or Adonis vernalis, another favorite of Colonial days. As the flowers fade the awl-shaped leaves elongate to almost a foot before they die away. The variety Krelagei is a redder purple, a bit earlier to bloom, and in my experience far huskier than the type. In our Wellesley garden at least it has self sown freely and has formed quite a colony over a period of fifteen years.

Iris sindjarensis. This delicate pale lavender flower is one of the June irises and I have flowered it only a few times in a Massachusetts garden. The wide spreading fleshy roots are very brittle, the maize-like leaves a vivid yellow green (probably because they are so often caught by a freeze), the whole effect most un-iris-like. It blooms with the early daffodils and as I have never seen it in a thrifty mass, it is one of the last things I should plant for garden effect. Its lush green and delicate tints lend a thrill of novelty to be sure but once known I have never regretted its demise.

See illustrations pp. 60, 62.

SCIENCE SERIES NO. 5

TWO IRIS INSECTS

By Donald T. Ries, Ithaca, N. Y.

The Iris Borer (*Macronoctua onusta* Grote)

The Iris Borer, *Macronoctua onusta* Grote, is one of the most unwelcome and destructive insect pests of irises. It is not only serious because of its own injury to the iris plants, but in a great many instances the borer paves the way for the introduction of the soft rot disease of irises, *Bacillus carotovorus* L. R. Jones, to begin, in most cases, its fatal work upon the rhizomes. The material presented in this paper is based on observations carried on in New York and Pennsylvania over a period 1924–1928, although most of the work was done during 1927–28 at Cornell University, under the auspices of the American Iris Society. The cooperation of Col. J. C. Nichols, Dr. A. H. Wright and Mr. A. M. S. Pridham, all of Cornell University, is gratefully acknowledged. The author also wishes to express his thanks to Mr. Harry F. Dietz, Assistant State Entomologist of Indiana, for his kindness in turning over data concerning this insect in his state, to various Iris growers who very kindly supplied the author with valuable information, and to the Entomological Dept. of Cornell University for use of space and supplies.

The Iris Borer belongs to the family Noctuidae, a family of night-flying moths, the same group in which the cut-worms are found. This is apparently purely a New World insect as there are no records of it occurring in foreign countries. It was first described by Grote in 1874 from specimens collected by Prof. O. S. Westcott near Chicago, Ill. Although the original description does not include the foodplant, later publications give it as "German Lilies."

This insect is probably universally distributed throughout this country and Canada wherever Irises are grown or *Iris versicolor* is found, but in many localities the infestations are so slight that they go by unnoticed—hence apparently giving us a very limited distribution. The present recorded distribution in the United States includes Maine, Connecticut, New York, New Jersey, Pennsylvania,

Maryland, Ohio, Indiana, Michigan, Illinois, Kentucky, Wisconsin, Missouri, and Iowa. Its distribution in Canada includes localities in Ontario, Quebec, and New Brunswick. The accompanying map shows the approximate known distribution.

Fig. 1. Approximate distribution of Iris Borer.

From observations carried on by the author in New York and Pennsylvania and by Mr. Dietz in Indiana the most damage from this insect has been found in protected, thickly planted gardens rather than in open field plantings where there is plenty of wind and sunlight. It has also been observed by a number of workers that the moths are negatively phototropic, that is, laying their eggs among the shaded and protected clumps of drying leaves, in most cases. The moths fly just about dusk or on dark cloudy days, and usually hover quite close to the tops of the plants. There are a few records of where they have been attracted to lights, but the author has never found them in trap lights placed in the close vicinity of infested plants.

The moths (Pl. II, Fig. 2), which are about 60 mm across the about 30 mm long, emerge in the fall from about the middle of September to the latter part of October. The head, thorax, abdomen

and legs are purplish black. The fore wings, except the costal margin, which is purplish black, are leather brown marked with fine lines of black. The hind wings are fuscous, shaded with blackish on the costal and terminal parts, and are usually paler than the fore wings. In 1925 the emergence dates at Ithaca were September 12th to October 28th. In 1927 the moths emerged over a period from September 28th to November 7th. About 90 per cent. of the pupae in the breeding cages emerged, and of these all but one or two were perfect specimens. Dietz reports only about a 50 per cent. emergence and a large percentage of these were crippled. Dr. Frison, of Illinois, also reported that many of their specimens were crippled. Both reported finding crippled moths in the field which did not seem to be the case in New York State. This might be due to the fact that the middle-western states experienced a period of dryness during September and October while during that period the eastern states had quite a sufficient rainfall.

Mating takes place three or four days after the moths emerge and in nearly all cases observed took place among the leaves. The eggs are laid in the fall—a single female laying from 150 to 200 eggs over a period of several days. The eggs are small, about 1/50 of an inch in diameter and very beautifully sculptured. They are cylindrical and flattened on the top and bottom. When first laid they are shining white, but after several days the color changes to yellowish. By the end of the first week the color has once more changed and this time the eggs have taken on a distinctly brownish hue. Several weeks later when examined they had become a very delicate pink. When the eggs were uncovered and examined in the spring about two weeks before hatching they all appeared an extremely delicate lavender. The color became somewhat intensified just before they hatched in April.

The eggs (Pl. I, Fig. 2) are laid in small clusters of 25–30 in the folds of the drying leaves or in cracks of the small stems and rootlets around the base of the plants. One observer has reported the female ovipositing on the leaves of other plants nearby. Williamson, of Bluffton, Ind., has found the eggs laid from the ground up as high as six inches on the green leaves of the iris. It is seldom that the eggs are laid on the green leaves, the drying outer ones being preferred.

The eggs hatch the following spring, the time of hatching depending upon the weather conditions. In 1928 eggs were found

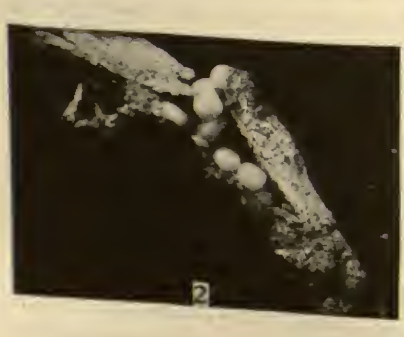

PLATE 1

Fig. 1. Section of Iris rhizome showing larva of Iris Borer.
Fig. 2. Eggs of Iris Borer (much enlarged).
Fig. 3. Larva of Iris Borer (about natural size).

hatching out of doors on April 18th, but a few eggs in indoor cages had hatched several weeks previous. Larvae that had just hatched were found as late as June 27th in Ithaca. Dietz has found newly hatched larvae as late as June 25th in Indiana. The young larvae when first hatched measure from 1.6–1.8 cm in length. They are light pinkish in color with a distinctly brown head. The body is sparsely covered with very minute hairs. Very soon after hatching the young larvae begin crawling about the foliage gnawing small holes here and there in the leaves. They continue this for several days and then a large proportion of them begin tunneling into the tissues of the leaf. This continues for about a week usually. A few days later the larvae leave their mines and once more migrate down the foliage to the base of the leaf sheath. Not all the young caterpillars act as miners. Those that do not, either eat out portions on the surface of the leaves or else work along the edges just inside the leaf sheaths. Soon after the caterpillars have entered the leaf sheath they begin chewing along the edges of the young leaves within, causing them to bleed. The whole lower portion of the plant takes on a watery aspect and in many cases the so-called "bleeding" is very pronounced. In fact in many cases the entire base of the plant becomes slimy and this is very often mistaken for the beginning of soft rot. This sliminess and bleeding is quite noticeable in cases of even very light infestations. Once inside the sheath the small larvae chew small places off along the edges of the center leaves, which may be seen quite readily after the center sheath of leaves has started growing (Pl. II, Fig. 1). Later in the season after the plants are through blooming, examination of the leaves will quickly show whether or not any borers are present, for those plants that have been attacked by the borers will in nearly all cases show a large number of small pinholes in the leaves, and the edges of the center leaf will have its edges filled with sawteeth. The entire base of the plant may become slimy and take on a watery appearance. The larvae soon begin tunneling into the stems. They first begin working inside the folded leaf and gradually work their way into the central leaf sheath until finally after six or seven weeks they reach the rhizomes. These they then tunnel out (Pl. I, Fig. 1), often reducing them to mere shells, but this injury which appears quite serious is very seldom fatal to the plant. A number of borers may start work on the same

plant but in no case has the author found more than one at the end of the season. In some cases it is the survival of the fittest while in others several of the larvae have migrated to another rhizome. After the borer has worked several weeks in the plant the center leaves may or may not begin yellowing, and in a number of cases when this was examined the whole central sheath of leaves could be pulled out. The base of this will clearly show the evidences of the borer's work.

The borer (Pl. I, Fig. 3) when full grown measures from an inch and a half to two inches in length, is pinkish white in color, with a reddish brown head, and a darker colored thoracic plate. Its body is sparsely haired and the spiracles form a row of dark spots on either side of the body. It may be easily found by digging into the rhizomes late in the season after the plant has finished blooming. There are either four or five instars, that is the larvae shed its skin four or five times during development. If the leaves in which the borer has been working earlier in the season are examined the cast head capsules may be easily found amongst the frass.

The borers continue tunneling in the roots until about the middle of August when they leave and work their way into the soil nearby to pupate. Pupation takes place almost anywhere in the soil but usually five to six inches away from the plant and from four to five inches below the surface, although some observers have reported finding them as much as ten inches directly below the plants.

The pupa (Pl. II, Fig. 3) is chestnut brown in color and measures about three-quarters of an inch in length. The pupation dates in 1927 were from August 11th to September 18th. In a number of cases the pupae have been found as much as a foot away from the infested clump of plants. In no case was a pupil cell of either earth or silk formed as is the case with many of the larvae that are members of this family.

The pupil stage lasts a little over a month, although again some workers and observers hold that some of the pupae winter over and the adults emerge the following spring. This, however, has not been proven one way or the other, but it is quite possible that such a thing may take place in the warmer climates where this pest occurs.

Larvae that pupated at Ithaca on August 23rd emerged on September 29th, while several that pupated on August 26th emerged

PLATE II

Fig. 1. Iris leaves showing early injury of Iris Borer. Note small pin holes and the dead center leaf.

Fig. 2. Adult moth of Iris Borer (about natural size).

Fig. 3. Pupa of Iris Borer (natural size).

on November 2nd. There is but one generation a year in New York and the same seems to hold wherever any work has been carried on with the biology of this insect.

The species and varieties that have been observed being attacked by this insect are recorded by Dietz as follows: *Pogoniris* all species and varieties (that is to say Tall-bearded or German; Intermediate or Interregna and Dwarf or Chaemiris-pumila); *Iris pseudacorus; Iris sibirica; Iris spuria; Iris tectorum; Iris Kaempferi; Iris Kermesina,* and *Iris laevigata alba-purpurea.* All of the above mentioned varieties with the exception of *I. spuria, I. Kaempferi* and *I. versicolor* have been found infested by this insect in New York. *Iris versicolor* seems to be peculiarly free from infestation in the vicinity of Ithaca although there are large stands of it along nearly all of the nearby streams. The author has carefully examined a large number of these native plantings but in no case has he found any evidences of attacks from the Iris borer although most of the plants were heavily infested with the Verbena Bud Moth (*Olethreutes habesena*).

The question of controlling this pest is a thing that is foremost in the minds of all iris growers and fanciers. It is likewise an extremely difficult question for the entomologist to answer. There have been a large number of methods suggested but space will not permit the author to enumerate them all here. Probably the foremost one, at least the method most recommended in growers' catalogues, is that of clean cultural methods. That is the cleaning up of all dead leaves and dry debris around the plants in the late fall and burning it. Since the eggs, as has already been shown, are laid in the drying leaves, this method *should* prove very effective. But in some gardens where this has been carefully carried out over a period of several years there has still been borer present despite all the cleaning up that has been done. It probably, however, helps to reduce the infestation to some extent.

Several workers have advocated the burning over of the iris plantings either late in the fall or early in the spring. For this a quick hot fire is needed in order to quickly burn the debris without injury to the tender shoots of the plants. But there are a number of dangers in using this method. For instance some of the semi-evergreen varieties, such as most of the dwarfs and many strains of the tall bearded irises, would be greatly damaged by the heat of the fire. Mrs. J. E. Hires has experimented a number of times

with certain of the semi-evergreen strains and found that the flowering qualities of the burned over plants were considerably below unburned ones the following year. She also found that the burning was liable to leave the foliage sappy and rot nearly always set in quite early the following year. In her estimation all varieties of *ricardi* and *mesopotamica* blood as well as *Dominions* are harmed by burning, even though the fire is a quick one. The burning might be successfully carried out if the plants were only an inch or so high but as soon as the new shoots get to be six or eight inches as is the case with Dominion seedlings in the late fall there is very grave danger of injury taking place after burning. Although, on the other hand, Mrs. E. P. McKinney, of Madison, N. J., in her book entitled "Iris in the Little Garden," recommends this method of burning in the spring with the aid of kerosene. However, in the experience of the author, there are very few iris breeders and growers who are willing to take the chance with burning over the beds in the fall. The burning, if done at all, should be done in the fall since as the eggs begin to hatch as early as April there is little chance of the debris drying out sufficiently in the spring to permit burning before the new leaf sheaths begin to grow. It must also be borne in mind that the iris rhizomes lie close to the surface and therefore the possibility of injury from heat is greatly increased.

Some growers who have raked and carefully handpicked all the old debris and dead foliage from around the plants late in the fall and burned it in hopes of ridding their gardens of the borer have all reported negative results. This is probably because of the fact that many of the eggs are laid among the small rootlets and so would escape the most thorough handpicking and cleaning up.

Spraying has been tried for several years with more or less fair effects. The use of this method was based on the habits of the young caterpillars feeding externally on the foliage for a week or so after hatching. Iris foliage is very difficult to coat properly with a spray not only because it is erect but it also has a very slick surface to which liquids do not readily adhere. The following mixtures were used:

1.	Arsenate of lead	2.	Arsenate of lead
	1 ounce		1 ounce
	Fish oil soap		Casein
	1 ounce		1 ounce
	Water		Water
	1 gallon		1 gallon

The mixture containing the casein seemed to spread a trifle better than the fish-oil soap mixture. Both mixtures must be kept

well agitated and sprayed on with a good pressure for the more pressure the finer the spray and the better it adheres to the foliage. The time of the application will depend, of course, on the time of the hatching of the eggs. Four or five applications at intervals of a week to ten days gave about 90 per cent. control in most cases. Just how satisfactory this method will be is yet to be determined and further experiments with it must be carried on. This method should not be used just before blooming as there is danger of rotting off the flower heads.

A number of experiments with several different dusts have been tried but no convincing evidence either for or against their usage has been obtained thus far. Here again further experiments are needed.

Several soil fumigants such as carbon disulphide, calcium cyanide, mercuric chloride (corrosive sublimate) and Semesan have been experimented with—but although the control of the pest has been effected in numerous cases some injury has also been caused to the plant, in fact in no few cases killing it completely. This was especially true with carbon disulphide, although Prof. E. N. Cory, of the University of Maryland, using the following carbon bisulphide emulsion obtained very good results:

1 part soluble rosin fish oil soap.
3 parts by volume of water.
10 parts carbon bisulphide.

These liquids were agitated until an emulsion was obtained. This stock solution was then diluted with an equal amount of water and applied to the plants.

Mr. Dietz has obtained quite promising results by the use of Evergreen, one of the pyrethrum sprays. This substance was used as a dip, but was not successful under field conditions.

A solution of $\frac{1}{4}$ ounce of calcium cyanide to a gallon of water seemed effective in killing the borer with very little or no disastrous effect to the plant. A similar solution using only $\frac{1}{8}$ ounce of calcium cyanide to a gallon of water in most cases seemed to be quite effective in killing the borer without injury to the plants. The solution was applied around the base of the plants, with a watering can, with the sprinkler removed. This solution might also be of value in holding soft rot in check. As yet the problems of controlling this insect seem to be unsolved. It seems that the greatest injury occurs in small, closely planted garden plots where the other

plants are all growing in a mass together thus making it nearly impossible for the sun and wind to get in amongst the lower portions of the plants where the moths usually hide late in the season, while in large commercial plantings that are usually planted in more or less open wind-swept places having plenty of sunlight and few good hiding places for the moths there is usually not so much damage from the borer.

The practice of resetting Irises every two or three years seems also to be a help in holding this insect in check. Although many say this is accomplished because immediately after blooming, when this should be done, the borers are still quite small and many will still be high up in the leaves and thus destroyed. This, however, at least from observations by the author, does not always hold, as a number of cases have been observed when the borer was nearly three-quarters grown and well down into the rhizome at the time of resetting. Anyway, at the time of resetting, all the trimmings should be carefully collected and burned to prevent any of the borers escaping and migrating to the newly planted roots.

Probably the most effective measure for controlling this pest that has been employed so far is to carefully examine the iris planting late in July or early August and wherever small piles of "sawdust" or frass are found around the base of the plant the rhizome should be carefully dug out with a sharp knife, the borer removed and killed. It might be desirable after this to sprinkle the cleaned root with a little corrosive sublimate solution (use 1 part corrosive sublimate to 1,000 parts of water, or 1 tablet to 1 quart of water) to protect it against any possible infection from soft rot.

Another question that has come up in the minds of many growers is the possibility of controlling this insect by the use of parasites. Just how effective this will be is not definitely known. Two parasites have been reared from the Iris borer by Mr. Dietz, of Indiana. These were bred from material collected in the vicinity of Indianapolis. They are *Apantales militaris* Walsh and *Ambly-teles jucundus* Brulle. Both of these parasites are hymenopterous wasps belonging to the superfamily *Ichneumonidae,* and both are parasites of the common Army Worm, *Cirphis* (*Leucania–Helio-phila*) *unipuncta.*

In speaking of these two parasites in his recent article Dietz says:

"*Apanteles militaris* is a small blackish parasite about two or three mm long and individually inconspicuous. However, since a large number hatch from a single worm this species ought to be quite effective. The adult female *Apanteles* lays her eggs directly into the body of the caterpillar. These eggs hatch into grubs which feed on the vital organs of the caterpillar. The grubs become full grown just before the caterpillar is ready to transform into the pupal stage. They then bore through the body wall of the caterpillar and spin an elliptical silken cocoon. These whitish cocoons which are tinged with brown are massed in the tunnels of the borer beside or near the shrivelled remains of the victim.

"*Amblyteles jucundus* is much larger and more conspicuous than *Apanteles*. It measures between eleven and fourteen mm in length. It is deep reddish brown to blackish in color with the second segment of the abdomen yellowish and with the third, fourth and sixth segments banded with white. To the layman it resembles a small wasp. Just what stage of the borer's life cycle it is attacked by the adult *Amblyteles* is not known, and how many eggs are laid by a single parasite on each caterpillar has not been determined. It is presumed, however, that the borers are attacked after they are quite large and that only a single egg is laid on each caterpillar. If this presumption is correct then the caterpillar is not prevented from changing to a pupa and at least part of the development of the parasite grub takes place in the pupa of the borer. It is from the root borer pupa that the adult parasite merges through a large hole that it tears in the anterior end of the victim."

Mr. S. A. Rohwer, of the United States National Museum at Washington, reports that these are the only two parasites that have been recorded from the Iris root borer, *Macronoctua onusta*.

Mr. Dietz reports that he has recorded a number of larvae killed by mites. The author has found mites in the burrows of the Iris borer but they have never appeared to have had any very serious effect on the borer.

Since writing this article Prof. E. N. Cory, of the University of Maryland, has reared two Hymenopterous parasites. These have been determined as *Amblyteles brevicinctor* Say and *Amblyteles jucundus* Brulle. Prof. E. I. McDaniel, of Michigan State College, has reared a Dipterous parasite that has not yet been determined. Mr. E. L. Chambers, of Wisconsin, also reported that his assistant, Mr. E. P. Breakey, has recently reared a number of Hymenopterous and Dipterous parasites, none of which have been determined.

Verbena Bud Moth (*Olethreutes hebesana* Walker)

During the spring of 1927 a number of Iris breeders reported that a "small green worm was eating the inside of the seed pods." A number of these larvae were collected in June and reared. The adults were determined as the Verbena Bud Moth (*Olethreutes hebesana* Walker). This insect was first described by Walker in 1863, but it was not until 1868 that Fuller published C. V. Riley's complete description of the larva, pupa and adult. Through all these years, however, very little has been published on the insect.

This insect was given its popular name of "Verbena Bud Moth" by Mrs. Mary Treat in 1869 as that was the plant on which she had found it feeding. It has, however, been known under a number of scientific names. These are as follows:

Sciaphila hebesana Walker, Brit. Mus. Cat. Lepid. XXVIII: 342, 1863.

Carpocapsa inexpertana Walker, Brit. Mus. Cat. Lepid. XXVII: 394, 1863.

Sericoris foedana Clemens, Proc. Ent. Soc. Phila. 5: 134–135, 1865.

Penthina fullerea Riley, Amer. Jour. Hort. & Flor. Comp. 4: 207–209, 1868.

Penthina hebesana Walsingham, Illus. typical specimens of Lepidoptera Heterocerca in Coll. Brit. Mus. pt. 4, 31, 1879.

Argyroploce hebesana, Barnes & McDunnough, Check list Lepid. Boreal Amer. no. 6827, 1917.

Endothenia hebesana Heinrich, U. S. Nat. Mus. Bull. 132: 103, 1926.

Olethreutes hebesana Fernald, In Dyar, U. S. Nat. Mus. Bull. 52: no. 5038, 1903.

This insect is widely distributed throughout this country. Localities from which it has been recorded include Massachusetts, New York, New Jersey, Pennsylvania, Maryland, District of Columbia, Virginia, North Carolina, Florida, Texas, Ohio, Indiana, Missouri, California, British Columbia, Alberta, Manitoba, and Ontario. There are no European records so it seems that it is a native insect. The acompanying may shows the approximate distribution.

It is a general feeder, having been reported feeding on *Antirrhinum, Dasystoma, Gerardia, Gentiana, Iris, Orthocarpus, Pent-*

stemon, Phytostegia, Solidago, Stachys, Tigridia, Verbascum and *Verbena.* In nearly all instances the larvae were found feeding on the seeds.

The Verbena Bud Moth belongs to the family *Tortricidae* of the order Lepidoptera. The larvae of this family for the most part live in the seeds, buds or between the leaves which they have fastened together with silken threads.

FIG. 2. Approximate distribution of Verbena Bud Moth.

The first time that the work of this insect was called to the attention of the writer was the middle of June, 1927. At that time Colonel Nichols reported this small whitish larva in several seed pods that he had opened. At this time the larvae were nearly full grown and measured about one-half inch in length. The general color was whitish although frequently the body was inclined to be washed with yellowish or greenish. The head and thoracic plate are black and the body is covered with fine hairs. The venter and legs are similar to the dorsum in color. The larvae collected on June 18th pupated two days later (June 20th). Before pupating, however, they cut a small hole in the side wall of the seed pod leaving only the outer epidermis intact. (Pl. III, Fig. 4.)

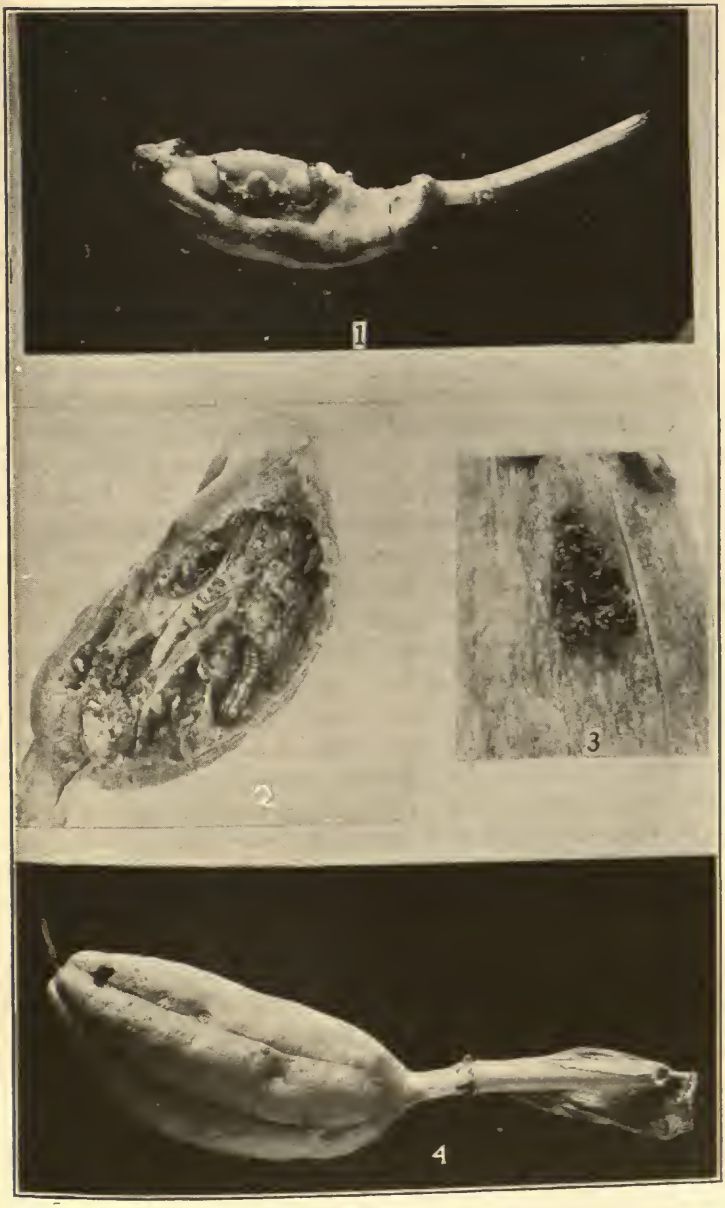

PLATE III

Fig. 1. Section of Iris seed pod showing larva of Verbena Bud Moth.

Fig. 2. Section of Iris seed pod showing damaged interior and pupa of Verbena Bud Moth.

Fig. 3. Adult moth of Verbena Bud Moth (×3).

Fig. 4. Iris seed pod showing punctures made by escaping Verbena Bud Moth adult.

The pupa is light brown color and about $\frac{1}{4}$ inch long. It has two distinct rows of small teeth on the anterior dorsal portion of each segment. During the summer the pupa is held in place by a few silk threads that can hardly be called a cocoon. The pupal stage usually lasts about 14 days.

The first adults emerged on July 2nd. These were fed with sugar syrup in the outdoor cages; on July 4th the first eggs were found deposited near the base of the seed pods. The adult moth is small, being about $\frac{1}{4}$ inch long and about $\frac{1}{2}$ inch alar expanse. The head is buff brown with the eyes somewhat darker, the antennae are short. The abdomen is grayish. The forewings are silvery gray with rich brown and metallic markings tinged with purplish. There is a distinct brown band crossing the middle of the wing; this is bordered with a paler color. There is also a curved brown spot near the terminal margin of the forewing. The hind wings are lighter brown, becoming darker toward the posterior margin. The cilia on the outer margin are a light buff color. There seems to be little sexual difference except in the narrower, less pointed abdomen of the male. The adults are long-lived, living for about two weeks in the cages, although several individuals have lived as long as a month in the outdoor cages. Despite this long life oviposition seems to take place but once and that two or three days after emergence providing that there is food available. Several fertile females were not fed for four or five days after mating, but as soon as fed immediately oviposited on some leaves in the cage.

The eggs are 1/100 to 1/120 inch long diameter. They are elliptical in shape and distinctly flattened. They are creamy white when first deposited and the surface is covered with very fine granulations. After several days they become distinctly pinkish color and then take on a dirty white or grayish color just before hatching. They are deposited either singly or in small batches of five or six. No check on the number of eggs laid by a single female was obtained, but it does not seem that the number would be large, probably 75 to 100. In a number of cases the egg was found laid in a small depression on the surface of the pod as if the place had been hollowed out by the female. No structures present in the female would indicate that this is possible. These small depressions were distinctly noticeable after the egg had hatched and the young larva had worked its way into the pod. The egg hatches in 5 to 8 days, depending on the weather conditions, sometimes in

August and September the incubation period may be prolonged to 10 or 12 days, while several eggs of the July brood hatched in 3 days.

The young larvae are very minute, usually less than 1/16 inch long, and are nearly transparent save the dark head. The body is clothed with many minute hairs.

For several days after hatching the young larvae feed on the surface of the host plant in the vicinity of the cast egg shell; during this time they are extremely difficult to find because of their minuteness and light color. They then work their way in through the seed pod, usually leaving a slight scar and depression at the place of entrance. Once inside the larva feeds ravenously on the seeds and tissue within the pod, sometimes as many as five or six larvae being found in a single pod. This is not usual, however. Many times the presence of larvae in the pod may be detected by an opening in the side through which the frass is thrown out. This is especially true in the smaller pods. And as has been mentioned above, the larva just before pupating opens a channel to the surface through which the pupa may wriggle its way. The larval period lasts on an average between 20 to 23 days.

When ready to transform the pupa wriggles its way half out of the pod (Pl. III, Fig. 2) and the adult moth emerges.

The entire life cycle in New York State occupies 43 to 47 days in summer and there are at least four generations a year as shown in the accompanying table.

The writer has shown in the above table that there are at least two distinct sets of broods, but judging from the great variation in the size of larvae collected throughout the season there is probably a large amount of overlapping of broods.

In the gardens examined most of the 4th brood was found feeding on the leaves (Pl. IV, Fig. 1). In iris gardens where Japanese and Siberian varieties were present a number of this last brood attacked the seed pods of these varieties. When cold weather set in the larvae that were feeding on the leaves either spun a frail cocoon and pupated among the leaves or tied several leaves together with silk and frass and there spent the winter as larvae. A number of such cases were found by examining the dead leaves and debris in the beds during the winter while looking for Iris Leaf Spot (*Puccinnia iridis*). And large number of native plantings of *Iris versicolor* were examined in both 1927 and 1928. The habits of

	1927			1928				1929
	2nd B	3rd B	4th B	1st B	2nd B	3rd B	4th B	1st B
[a]Egg		Jy. 4	Aug. 17	Oct. 2	*Apr. 20 May 20	*Ju. 5 Jy. 1	*Jy. 20 ‡Aug. 16	*Sep. 4 Oct. 4
[a]Larva	[b]Ju. 18	Ju. 11	Aug. 24	Oct. 9	*Apr. 29 May 28	*Ju. 12 Jy. 9	*Jy. 27 Aug. 25	*Sep. 12 Oct. 14
[a]Pupa	Ju. 20	Jy. 31	Sept. 14	*Nov. 5 May 2	*May 20 Ju. 20	*Jy. 3 Jy. 30	*‡Aug. 18 Sep. 17	†Jan. 12
[a]Adult	Jy. 2	Aug. 14	Sept. 30	*Apr. 18 May 17	*Ju. 3 Ju. 30	*Jy. 18 ‡Aug. 13	*Sep. 2 Oct. 4	

[a] All dates given are when peak of stage was observed in cages.

[b] The first larvae were collected on June 18th at which time they were nearly mature

* About 18 per cent. of the larvae pupated about Nov. 5. This mark will be used throughout to designate No. 1 set. The remaining 82 per cent (No. 2 set) pupated May 2nd

‡ These are estimated dates due to the fact that the cages were not checked during the Fourth International Congress of Entomology.

† Five pupae were found on this date—they probably pupated in November as did the larvae the previous season. Some of both the first and second sets are included in these pupae.

the larvae in this variety differ somewhat from the habits in other varieties. In no case were the larvae found feeding on the leaves but always in the seed pods. In the wild iris when the larvae were ready to go into "winter quarters" they tunneled out several seeds, tied them together with silk and frass and there spent the winter, for the most part as larvae, although some pupae were found in both 1927 and 1928.

In the spring, even after *I. versicolor* had been under water for several weeks during the spring floods the larvae successfully pupated and the adults emerged.

The adults from the set that wintered as pupae emerged in May and fed upon the leaves of the iris in the gardens. Where the early adults from the native plantings of *I. versicolor* oviposited, the writer was not able to determine, but with its wide range of food plants it was difficult to trace in all the various weeds and early spring flowers on which it might feed. The adults of the second set, that wintered as larvae, emerged late in May about the time the seed pods of the early Pumilas were beginning to form and the

PLATE IV

Fig. 1. Work of Verbena Bud Moth on Iris leaves.

Fig. 2. Iris seed pod showing work of Verbena Bud Moth. (a) Where egg was laid. (b) Pupal skin. (c) Adult moth.

Fig. 3. Showing work of Verbena Bud Moth on exterior of Iris seed pod at (a).

eggs were laid directly on these. It was observed that these larvae did not always bore into the pods but many times worked under the sepals that had persisted and still clung to the side of the pods. Many times this would so weaken the pod that it would break off.

Several small Hymenopterous parasites of the Family *Ichneumonidae* were reared from the pupae of this insect.

A number of control measures were tried with more or less effectiveness.

Spraying with the following mixture gave quite satisfactory results:

Arsenate of lead	1 lb.
Casein	1 lb.
Water	25 gal.

The first application was made soon after the pods had developed, and a second was applied about 8 or 10 days later. In cases of very heavy infestation a third application was made 10 days later.

No oil sprays were tried but the writer hopes to experiment with some of these in 1929.

Dusting the pods three or four times during the season with sulphur also proved effective. Dusting with sodium fluosilicate also gave promising results.

A number of breeders have advocated bagging the pods early. One man uses old tobacco bags and reports very satisfactory results. Another breeder uses glazed paper bags but in several cases he has had serious injury from the larvae working their way up under the bags much to the grower's consternation.

Another method that has proven itself very satisfactory is that of clean culture as recommended for the Iris Borer. The cleaning up of the old growth and debris around the beds either late in the fall or very early in the spring will do much in controlling this insect.

With all of these carefully executed measures there is always the source of infection that we cannot combat, namely, the neighbors' gardens and the native plantings of irises and weeds.

1928 NOTES ON IRISES, BEARDLESS AND OTHERWISE

By Dr. J. R. McLeland, Pleasanton, Kansas

In an article in the March, 1924, number of the Flower Grower I suggested that there was a different species from that of Iris versicolor, and now the truth of this suggestion is borne out by Dr. J. K. Small, of the New York Botanical Garden, who in Addisonia, designates this species as Iris shrevei from Dr. Ralph Shreve, of Farmington, Arkansas. This same species is now designated and proven by Dr. Edgar Anderson of the Missouri Botanical Garden of St. Louis, Mo., to be the TRUE Iris virginica of Linnaeus, so I was not far off when, without much scientific investigation, I decided there were at least two if not three species of the versicolor group. In that article in Flower Grower I had the names reversed. As I have just said I had made but little scientific investigation at that time, but now Dr. Anderson makes it very clear in his exhaustive treatment in his work just printed entitled "The Problem of Species in the Northern Blue Flags, Iris versicolor Linnaeus and Iris virginica Linnaeus."

Dr. Small in Addisonia gives us Irises versicolor, shrevei and carolina, while Dr. Anderson in his work says Irises carolina and virginica are identical. From my own observations from collected specimens I believe I will have to agree with Dr. Small as to Iris carolina being a distinct species, but can see no use in now using shrevei for a species that has been named from the time of Linnaeus Iris virginica.

I find from my collection that the true type of Iris versicolor is confined to the Atlantic Coastal plain States as far south as northern Virginia and those States occupying the drainage basin of the Great Lakes region, while the much larger, less branched, fewer flowered and sweet scented Iris shrevei of Small (virginica of Linnaeus and Anderson) ranges from Virginia to Texas as the southern limit and from Texas to Minnesota as the western limit, thus overlapping the Versicolor territory on the south and in Minnesota, Wisconsin and Michigan on the north as is perhaps true in parts of Canada. Dr. Anderson bears me out in this statement when he says hybrids of the two species have been found by him in this region and I think I

have a hybrid sent me from Virginia as Versicolor. Now as to the third branch of this family there is Iris carolina ranging from as far north as along the banks of the Mississippi River in southern Illinois to and including the South Atlantic Coastal plain States also overlapping the other two branches of this family. In my opinion this species is readily differentiated from the other two by means of its almost evergreen short foliage, short bloomstem ranging from 12 to 18 inches, few flowers, mostly a light blue laid on over a white ground, yellow to brownish orange unveined signal-patch or blotch, and that it is scarcely hardy even in the latitude of Kansas. It also usually has but a single row of seed to the locule and they are usually cylindrical. I think there can be no doubt but that Iris carolina is nearer Iris virginica than to Iris versicolor.

In my collection of this species I have one with the broad round parts of a Bearded iris, and others with very narrow parts. One of the oddest was collected in the swamps of western Alabama, and is as fine a double flower as any I. kaempferi I have ever seen. It is so double in fact that the pollen-anthers have petal-like appendages, and surprising to state, it is really a beautiful flower, the arrangement of the narrow parts being such that the yellow center shows up to great advantage.

I will say here that those who have seen only the type of Iris shown in Addisonia as Iris shrevei from Arkansas have never seen this beautnful species at its best. In the plate the clear color of the parts, and the beautiful golden to orange signal-patch or blotch seem almost absent as they are in the true Versicolor. Perhaps the very brightest specimens of this species were collected in Minnesota and Wisconsin, also one from Northern Texas, all of which show clear pure coloring of the parts and an UNVEINED signal-patch or splotch. One almost sure way of identifying this species is by the seed-pod which ranges anywhere from 3 to 4½ inches long, while in Versicolor the pod ranges from 1½ to a little more than 2 inches in length, and that of Carolina is about the same as Versicolor only it usually has but a single row of seeds to the locule, and these are cylindrical and not 'D' shaped as in Versicolor. From now on I will drop the designation of Iris shrevei for the older one, Iris virginica. Now after these introductory remarks I will describe some hybrids I have produced by crossing the three species one with the other. So far I have many hybrids between Versicolor and Virginica which I designate as Versiva (from Versicolor and Vir-

ginica) which are a wonderful improvement on either parent, some being over four feet high, with the color, shape and branching habits of Versicolor and the size and height of Virginica and sometimes even taller and more robust, and nearly always with the beautiful yellow to orange signal-patch or splotch of this larger parent but freer of veining. I notice that Dr. Anderson designates a similar natural cross found in the north where the two species intermingle by the name of X Robusta, which is very appropriate. I have developed a strain of Versivas that have, for a native Iris, very sparse foliage, thus meeting an objection against this group of having too much foliage for the number of flower stems. These are extremely floriferous. I have another strain where the flowers are as large and look almost like the very best Iris orientalis and Sibiricas except for the coarser foliage of this group. Dr. Anderson speaks of finding Virginicas as red as Versicolor kermisina. He also speaks of finding some clumps of Iris virginica that are pure white with yellow splotch and in the same colony was found others that were white edged and veined blue similar to the Bearded variety Madam Chereau. This variety was also found several years ago by Dr. Ralph Shreve, of Farmington, Arkansas.

As to Iris carolina it will probably not lend itself to any great extent to the improvement of these Irises altho I have a fine lot of hybrids from a larger kind than the type, Iris carolina nelsoni X I. species from Texas which gave some very robust plants between 4 and 5 ft. tall, with rather narrow but long parts with the usual golden splotch. This might be used to cross with some of the other hybrids such as Versiva.

While on the subject of hybrids will mention here another odd one, Versilaev from Iris versicolor X Iris laevigata albopurpurea, a beautiful dark purple self with a golden line similar in marking to the hybrid D. K. Williamson only smaller and of course on an erect stem some twenty-six inches in height. This hybrid has the foliage of Versicolor and the blackish tipped greenish-white pod of Laevigata. The seed-pods often grow to full size but so far have never contained a single seed. I was induced to try for this hybrid from a suggestion made by the late W. R. Dykes that he thought such a cross possible from a similarity of seeds.

I have perhaps ten plants some of which ought to bloom next year from crosses of different specimens of Versicolor and Virginica X by pollen from Pseudacorus alba. These are all that germinated out of a handful of seemingly good seed.

The seeds of these various hybrids are almost sterile and those of Versiva are spherical in shape due perhaps to lack of pressure of the few seed that develop in each pod. I am planting great handfuls of these pods this fall, and do not expect to be overrun with seedlings either as one may expect one out of a hundred to germinate. When people go to using this class of Irises more they need not fear being overrun by plants from selfsown seeds, at least that is my experience with them.

Now in regard to reciprocal crosses; last year I made this cross between the Albinoid virginica from Arkansas and a similar Versicolor from Connecticut and strange to say the two crosses, in plants anyway, are no more alike than anything. Those in which Virginica was the seedparent are great robust plants and it seems nearly every seed germinated, while of those in which Versicolor was the seed-parent few germinated and made little scrawny plants. Another season will probably show other differences. These plants were in the same plot, side by side.

Now perhaps I shall be disputed in what I am going to say, but that is all right, for theories are right when they work out, but when they do not we rearrange them to comply with the proven facts. A few years ago before I had even heard of Virginica albino, I had a plant of Iris sibirica. Distinction growing near a plant of Iris carolina (Mississippi) from the former of which I saved the seed and got a lone seedling from the whole pod of seed and this seedling was years developing enough to flower but the past season of 1928 it did flower and was as much like a whitish Virginica as anything I have seen even to the arrangement of flowers on the stem.

I have been intercrossing Hexagona with the other two species of this group, Iris fulva and Iris foliosa, and their hybrids D. K. Williamson, Fulvala and Fulvala violacea. D. K. Williamson and the very large flowered Hexagona from Louisiana produced the clearest blues and lavenders I have ever seen in the Iris family, and all of these were provided with very good stems also. Hexagona and the two Fulvalas gave me some very fine things throwing some lighter and some darker D. K. Williamsons. One cross produced a fine rose colored flower of medium size on an erect stem some 30 inches in height. This plant I have named 'Rosa', and as I have some low growing foliosa-like plants with immense beige to pink flowers I ought to have the material to build a fine large rose colored Hexagona. From this cross are some plants that closely resemble Dr. Small's newly found Iris vinicolor.

Crossing a natural hybrid found with Iris fulva in southern Louisiana and named Hexagona purpurea (Dean) with Fulva gave me almost every shade from pink to mahogany brown, some of which doubtless are very similar to this new found species? One outstanding characteristic of the True Hexagona is its odor of Sandalwood which is transmitted to all of its hybrids.

I think the best and most outstanding production from crossing the Hexagona group is a very large blackish purple flower with a great orange signal patch or splotch, parallelogram-like in shape about ¼ inch in width, on a strong erect stem that measured 33 inches in height, while, this year, those of D. K. Williamson scarcely reached 24 inches, growing in the same plot. In moving these numerous seedlings from the large galvanized tubs that I plant my rare crosses in to keep the moles from them, several did not flower the past season. I note that all of these hybrids flower stronger and better the second year. Wherever I use Hexagona on these other two species it seems to give body to the flower and lays its color over that of the others giving a rather velvety surface to the parts. I sometimes think that in these crosses I get a faint glimpse of how the Japanese produced the very double flowers of Iris kaempferi. In these crosses of the Hexagona group I have had the first flower of several hybrids to have all six of the parts alike in coloring, texture and arrangement, but the next flowers always reverted to type. As patient as the Japanese are it might be easily imagined that by watching for and following up this peculiarity for several generations one might produce such beautiful Hexagonas as has been done in Irises kaempferi and laevigata.

Another thing I have noticed, that the signal patch or splotch of the Beardless Irises, especially in hybrids of the Hexagona and Versicolor groups, nearly always give up the veining and often become a clear yellow or orange and are often reduced to a mere line as in Iris vinicolor, hexagona purpurea, fulvala, fulvala violacea, and in the most of my hybrids of this group. This is also true of my Versicolor-laevigata cross—Versilaev—which has a golden line instead of the veined patch that the parents have. I have never had the pleasure of seeing Iris chrysographes in bloom but from the descriptions and color plates I have seen I take it that it, too, has a golden line at the base of the falls, and if my observations are true in the species I have tested, it too may be a hybrid between two or more species. I have already flowered a new species of the

Sibirica group from the Likiang mountains of Yunnan, China, received from the U. S. Government, S. P. I., No. 59021, that is very like the color plates of Chrysographes in shape but is of a lighter shade of blue and instead of the golden line has a white inverted heart shaped signal patch free from veining except at the tip. I would like to submit the name Iris likiang for this new species.

I have used it as pollen parent in a cross with a seedling Orientalis and have a strong plant from this cross that ought to flower in 1929. The hollow stem of I. likiang places it in the Sibirica group.

The next one I shall describe is Iris hybrida Pal-verna. The season of 1926 having flowers of Irises Verna and Pallida at the same time, I thought I would act upon the suggestion of the late Mr. Dykes in his Handbook of Garden Irises, pp. 147 and 8, in which he says, speaking of Iris verna, "This small species seems to be the one approach to the development of a Bearded Iris that is found in America. It has every appearance of a small Pumila or Chaemaeiris except that there is no visible beard but merely a pubescent orange band on the falls consisting of short unicellular processes." So I attempted the cross and secured eight seed on a Mandraliscae or Pallida seedling, five of which germinated the first spring out of which I saved four plants and last spring two more seed came up making six plants saved of this cross one of which was strong enough to bloom last season. The plants have the foliage of a Pallida, with a stem some 12 to 15 inches in height just about topping the foliage, the spathe was more herbaceous and keeled than in Pallida, containing three buds on very short pedicels all coming out on the same side of the stem. The beard is rather scant and the odor is somewhat different from that of Pallida. Standards spreading or open, somewhat different from that of Pallida; Standards spreading or open; falls are a little narrower than the standards like the pollen parent Verna—color a dark lavender blue marked like Pallida. The Beard is rather scant and there was absolutely no pollen. I tried to cross again with pollen from Verna but so far without success.

I am led to believe from some of these wide crosses I have made that the Bearded Irises are a later production than almost any other species, as in all of these crosses it reduces the number of flowers to two to three to the head, as will be found in the Oncocyclus, Regelio and Pseudoregelio groups, all similar to Loptec, Paltec and

Palverna. I find there are many things in this hybridizing business that can not be readily explained and as I have no theories to vindicate will not try to.

NEW IRISES AT FREEPORT, ILL.

Each succeeding show of the Freeport Garden Club seems to surpass its predecessors in some respect or other. This year it was in the great number of new varieties, particularly American seedlings, which in competition with the Cayeux 1927 and 1928 sets gave the show the aspect of an international iris tournament. The American seedlings were of such high quality as to compete on even terms with the foreigners with several points of superiority.

America has no competition in plicatas, is measurably ahead in whites, has possibly the finest Dominion seedling yet offered, and is on fairly even terms in the pinks, reds and purple bicolors, as displayed at the Freeport show.

There has been a temporary setback in yellows in which class America has so long been pre-eminent, due to Miss Sturtevant's fine productions, although Prof. Mitchell's new yellow, Mirasol, and the Sass Nebraska were not on view and might change the scale.

It seems safe to say that the greatest variety of irises ever shown at Freeport was on view this year and it is likely that no previous American show has had as great a number of recent novelties and modern irises. The chief points of interest centered in the class for fifty blooms in which there were seven entries and Mrs. Douglas Pattison's non-competitive exhibit, always a magnet for iris visitors. Mrs. Pattison showed a large number of the new 1928 Cayeux seedlings which seem to be the most remarkable collection ever sent out in a single season, not excluding the Vilmorin year which gave us Ballerine, Ambassadeur and other beauties.

The fifty class was remarkable for the diversity of varieties shown in the different entries and gave the judges, Mrs. Silas H. Waters, of Cincinnati, and Sherman Duffy, a difficult problem.

The old varieties were in a small minority in all seven exhibits. One entry specialized in the Mohr-Mitchell seedlings, Purissima, being a noteworthy flower with the beautiful red toned Aurifero glowing with a yellow center, another. Mrs. W. L. Karcher who has been an indefatigable worker for the success of the Freeport shows but who had never before exhibited won the fifty class first

prize with a finely balanced collection of American and European varieties.

Mr. G. L. Boehland, of Rockford, scored heavily in various classes and won the seedling prize with a bloom of attractive coloring, a richer Mary Gibson with more yellow in it and a far better stem.

The show was more spaciously housed than ever before in the beautiful new Masonic Temple. A new modern hotel also made the stay of the hundreds who tour to Freeport annually for the show and to visit the irises in Mrs. Pattison's garden before they are cut for the show benches, more comfortable and attractive.

A series of pool gardens at one end of the hall was a beautiful feature. The show was characterized by the finest quality of bloom that could well be imagined, due to an unusually propitious season, much in contrast to the chill wet weather that proved such a handicap last year. A noteworthy feature was the great cultural skill displayed by the Freeport exhibitors who grow their irises to the limit of their capacity. They get all the height and size there is in the plant. It pays to give the iris good culture. Because of its ease of growth, gardeners seem to have come to treat the iris almost as if it were an epiphyte and the roots merely necessary attachments, the quality of soil making little difference.

The Freeport growers give their irises bone meal annually and some of them this season gave a dressing in early spring of a widely advertised commercial fertilizer which gave excellent results in vigorous growth, tall stems and fine blooms.

Interest centered in the Cayeux 1928 set and especially in the new yellows, Pluie d'Or and Helios. In the former we at last have the tall pure rich yellow. The bloom is identical with Gold Imperial in color, size, form, and texture. Blooms of the two held side by side were indistinguishable except for the orange beard of Gold Imperial while that of Pluie d'Or is yellow. The stem of Pluie d'Or, however, by actual measurement of the tallest stem of Gold Imperial in Mrs. Pattison's Garden, was eleven inches taller, the heights being 28 and 39 inches respectively. The stem of the newcomer is low, widely and symmetrically branched. It is certainly a beautiful iris.

Helios is one of the yellow irises which are not really yellow but cream colored, lighter than Shekinah. It is a big round flower of medium height with the falls lined with crimson similar to the falls

of Carcanet. It might be characterized as a giant Carcanet minus the ruffles and paler.

Although W. R. Dykes, apparently an early bloomer, faded two days too soon to get to the show, many visitors to Freeport saw the famous English yellow in bloom in Mrs. Pattison's garden. It was the subject of much discussion and diversity of opinion. It is as strange, unusual, and wonderful a bloom in its way as William F. Mohr. It is not by any means the golden yellow advance descriptions led us to expect. Neither is it a clear yellow.

It is a huge flower, the blooms at Mrs. Pattison's seven inches tall and problably not typical as the roots were not received from England until November. The stem of the taller one was 36 inches and bore four of the huge flowers. The shorter was about 30 inches and had three blooms. They were very closely held.

The standards are magnificent, a luminous pale yellow. Nothing could be finer. They are of fine substance, well held, and frilled and notched something after the manner of those of William F. Mohr. A prominent brilliant yellow beard enchances the beauty of the standards. The falls are another story and there the argument starts.

The unusual form of the flower and its huge size led to speculation as to whether or not it had some oncocyclus in its parentage. The falls, however, are not short as in most pogo-cyclus, but wide, long, flaring and in excellent proportion to the standards. They are not a clear yellow by any manner of means. They have a cream ground with a fine network of deeped yellow veins, some strong or veining but not conspicuous and occasional dull purple spots similar to those found on the falls of some of the pumila hybrids. While these spots are not sufficiently obtrusive seriously to mar the beauty of the flower they do destroy the effect of a clear yellow iris.

Water color paintings of this iris which were sent from England depicted W. R. Dykes as a clear unmarked yellow. In this connection it is reported that when the paintings were made the iris had not developed these spots which are a development of its later life and did not appear at its first blooming.

The stamens have an ample supply of pollen which seems to be fertile as five out of six pollenations resulted in plump promising looking pods.

Whether they will contain viable seed remains to be seen. No attempt to seed W. R. Dykes was made. The foliage was scant,

short, and narrow but apparently healthy. The plants were grown in a cold frame over winter and were solidly frozen for three months, Freeport's minimum temperature last winter being 29 below zero with long periods of sub-zero temperature. Apparently this iris is not sensitive or tender to cold. It seems more likely that it is a Volstead act iris and demands strict dry enforcement to thrive.

Another bit of iris magnificence that came into bloom too late for the show both last year and this year is Dr. P. A. Loomis' Blue Velvet, hailed by some iris critics and with excellent grounds as the finest Dominion seedling yet introduced. It was the most intensely, darkly blue of all the irises in the garden, seeming even more velvety than Dominion itself of which it might be termed an intensified edition. The parentage, Dominion x Balboa, is interesting and suggestive of the possibilities of the mingling of Dominion and mesopotamica blood. It is possibly the tallest of the Dominions, well over three feet. The tall but stout stalk is well but short branched. It is of the Swazi type but makes Swazi show a surprising amount of red by comparison. There is no lightening of color at the margin of the bloom. It was one of the outstanding if not the most outstanding iris at Freeport. It has huge, heavy foliage and is a vigorous grower, apparently as hardy as a pallida.

Of the other dark colors, Labor was most impressive, a block of fifty or more stems giving a glowing spot in Mrs. Pattison's garden, and looking equally dazzling on the show bench. The peculiar mingling of dark red and blue purple with the glint of a coppery undertone makes this an iris that everyone wants.

On the showing at Freeport, there can be little compunction in discarding Allure in favor of Midgard. Allure was a washout this year. Under 90 degree sun it faded to a tinted white, not at all attractive, its delicate beauty much admired in the cool weather last year disappearing and apparent only as the bloom was unfolding. Midgard was one of the most admired irises, a gorgeous mingling of pink and yellow and it will be as heavily ordered this year as it was last.

Its rival was Marquisette, an exquisitely beautiful iris of fine height, branching stems and an altogether different pink tone. Visitors stood between Midgard and Marquisette trying to decide which they preferred and many like the writer decided they must have them both. Marquisette is some six inches the taller and of less firm

substance than Midgard but sufficiently durable to stand up under hot sun which we had all during show week.

There were a number of very fine new pinks shown, all of reported Aphrodite derivation and all so much superior to their progenitor that it is now regarded as more valuable for breeding stock than for the garden. The Cayeux Thais and Fascination were very fine, the former a very large, floriferous plant with pink something of the Lohengrin tone. Fascination, a somewhat smaller flower but taller is a clean rose pink, with much less purple in it than Aphrodite or Solferino.

The Sass Brothers had rival pinks that were fully equal to the French pinks, both under number, big and tall and of very clear, clean tones in the lighter tints. It was reported at the show that the Sass Brothers have a large block of pinks "down behind the barn," all of Aphrodite origin, so even in quality that it is difficult to pick any one as more outstanding than the others. If the two seedlings shown were a fair sample, we have a fine race of pink irises in the offing besides those already arrived. None of them, however, is any finer pink note in the garden than Dream, and will not displace it.

The Sass Brothers did not have their usual collection of seedlings at the show this year but they were spotted all over the place in the various exhibits. They have a large and enthusiastic following in the middle west.

The gorgeous brown and red King Tut was much admired, a glowing color, although the bloom is small and rather short. Visitors who have seen Mead's King Midas expressed the opinion that it is the better flower and of similar coloring. However, King Midas is such an early bloomer that it is out of the way before King Tut gets into full beauty so they do not conflict in garden value.

From the blended plicatas so much admired, the Sass Brothers now have switched to a long line of selfs of size and height, a much needed departure as purple bicolors, and red toned bicolors have become monontonously abundant, all huge and a large portion of them showing symptoms of the Dominion epidemic. It is becoming apparent that all Dominion seedlings are not good seedlings. Baldwin was one of the new Sass selfs, a big dark toned purple.

Of the selfs Rajput again stood out as one of the very fine things, not half appreciated by iris growers because it has not received the proper advertising. It is an iris of very individual color-

ing, big, upstanding and a salamander for heat. B. Y. Morrison's Elsa is another fine heat resister, its cool pale blue lasting three days under mercury in the nineties, a stately and handsome plant.

In the reds, Dauntless, Connell's gorgeous seedling, finds a rival in an unheralded Cayeux 1928 seedling as the world's reddest iris, Numa Roumestan. The latter is a perfect self, not velvety and of entirely different quality from Dauntless with standards and falls the same color as the falls of Dauntless, a very brilliant iris and one of the outstanding Cayeux newcomers. It is smaller and shorter than Dauntless with a high but widely branched stem.

Indian Chief, from Dr. Ayers, of Cincinnati, is a close rival of Dauntless, bigger and taller as shown at Freeport, but with a touch of purple in the standards while those of Dauntless are clear red.

Dolly Madison, Williamson's prize seedling, was a two opinion iris. It was either greeted with great enthusiasm or none at all. It is a delicate beauty that suffered by too close proximity to brilliant and strong colored irises such as Dauntless. Under such placing it seems dull and gray and beautiful only on close inspection. It would show to much better advantage under careful combination with less strong tones.

Those who estimate the beauty of an iris by its size had an eyefull in the new Cayeux giant, Nene, claimed to be the world's biggest and looking the part. It is said to reach nine inches in height. The blooms at Freeport were about eight inches and the biggest in sight. Unlike most of the big irises which showed decided symptoms of the "flops" in the hot sun, Nene stood up like a lighthouse, the standards showing not even a tremor. It is an iris of exceptionally beautiful form with the trimly tailored lines of Reverie but of rather ordinary purple bicoloring of medium depth. It will be a popular iris because of the stately beauty of its graceful lines and its size.

Don Juan, Farandole, and Enchantement were huge Cayeux bicolors of fawn and rose to red tones of great beauty and impressive stature. Cassandre, unfortunately named because of Perry's Cassandra, was an exceptionally fine dark bicolor much admired. Claude Aureau seems a new type of yellow bicolor of medium height with rich yellow round standards and brilliant red falls with a yellow edge. It is one that will not appeal as generally as some of the others, as red and yellow irises are in a minority among iris admirers.

The two finest whites at the show were Shasta and Snow White, both distinctive, the beautiful ruffling of the latter making it one of the much admired irises. Of fine height and great freedom of bloom, a large block of it in Mrs. Pattison's garden drew knots of admirers. Shasta was in magnificent form and outshone the popular and beautiful Micheline Charraire. It was finer than Purissima as exhibited at the show although the bloom of the latter was small and could not be regarded as typical. Purissima and Shasta are reported as Volstead actors, the former being especially intolerant. They are well worth the simple care of providing them with a roof of tar paper. Snow White was one of the finest specimen stalks at the show. It needs no cultural fussing.

Surprise, a new American seedling, has great height and fine medium blue blooms of Sensation and Realm tone. Its weakness is that it has a great length of naked stalk with the blooms all at the summit. Sensation and Realm were close rivals for the medium tone blue honors, the cornflower tones of the former making it increasingly popular. Realm has unusually strong midribs in the standards which make it an exceptionally durable bloom.

TID-BITS 19TH

Iris Melrose. In the October BULLETIN with its Descriptions I assigned the term "floppy" to the standards of this variety and have been called to account by the introducer for the libel, if such it be. Mr. Simpson quotes divers authorities and I have not seen Melrose in sufficient quantity this spring to gainsay them though I still suspect that any variety derived at least partly from Amas through Oriflamme is very likely to show weakness in the carriage of the standards. I am glad, however, of the correction as the descriptions rarely bring out any comment whatsoever and I often wonder whether their publication is worth the effort. The more one attempts to describe irises the more one realizes how uncertain they may prove in gradation of color, in substance, even in height and size under varying conditions of climate and culture.

Ratings. It is chiefly because of these possible variations in the varieties themselves that I find myself completely at odds with Mr. Gersdorff in his criticism of the present Score Card. He advocates the complete omission of height and of size as qualities

to be considered, both of which are easily measurable, in fact they are the only two points which are not largely a matter of personal taste and judgment. Furthermore the examples cited in the Score Card are in no case extreme nor are they absolute in state-

Photo by J. Oerts.

Iris reticulata.

ment. They are intended and so worded as to suggest reasonable comparisons rather than to state requirements. Any one who so misreads the word "preferably" or considers Rhein Nixe an unreasonably large flower or under the heading "Outstanding Quality" omits consideration of qualities not specifically mentioned is hardly suited to any use of a score.

"Outstanding Quality" is an undefined term intended to allow credit to any variety that is both clearly distinct from other varieties and pleasing in itself. To rate very highly, however, it should possess distinction in more than one respect,—hence the limitation of "not over" 5% as attributable for certain specified characters. There is nothing to prevent attributing the full 15% to irises like Tom-tit or Flutter-by which are markedly low in height and real additions to the garden picture nor, should we develop a miniature iris of perfect poise and form but only a foot in height, would it lack outstanding quality. On the other hand a great many of our best known novelties completely lack outstanding quality as garden plants whatever their qualifications may be in the show room. In the garden what distinction does Mary Barnett possess? or Brandywine, or many another? From a short distance no group of experts would agree as to the name of a variety of such usual coloring and form and habit while, on the other hand, there would be substantial agreement as to Valencia, Endymion, probably Cygnet, and quite likely Dominion, Gold Imperial, or Morning Splendor. With many new introductions of similar effect any of these may loose its outstanding quality but that is because some introducer has put out an "improved" variety rather than a real novelty.

The chief mistake in using the Score Card seems to lie in limiting oneself by using varieties given as examples, NOT as examples, but as strict requirements. The form of Princess Beatrice or of Queen Caterina may generally be considered good but to most of us Corrida or Garnet may appear equally pleasing and distinct. Some of us may even like Clematis as well,—it is certainly distinctive in form, and even if I disliked so untypical a form for an iris Clematis would receive at least 5% credit for its difference. The same thing can be applied to size, Rhein Nixe is a good sized amoena and what Mary Williamson would lose on size it would more than gain by its unique effect in the garden.

"Carrying Quality" I have always considered in placing my clumps of irises but to assign it a score value seems an even worse limitation than the present scoring on height and size. Our garden plantings are not always field plantings or in the distance and a variety without carrying quality in respect to color may be just the thing to plant at the entrance of a tea terrace where we may study its delicate reticulations. Against a back-ground of shad-

owed green none of the dark varieties have carrying quality; against light stucco none of the light varieties show up to advantage; against gray stone or shingles, the lavenders lose and many of our loveliest blends, May Sadler, Cameo, Steepway, etc., all assume dust or earth colored hues in the distance. And, if this is the case in the carrying quality of color, who can judge an individual's preference for color en masse. That, too, depends much on background and placing rather than anything inherent in the color itself.

Iris sindjarensis. *Photo by J. Oerts.*

I am more than willing to admit that a Score Card is necessarily arbitrary and is never quite satisfactory even to its originator but I certainly do not see the need of introducing such uncertainties as "carrying quality" and effect in mass, nor of so strictly limiting wherein a variety might be outstanding in quality from others. Mr. Gersdorff gives me no chance to rate highly Allies or Autumn King, both of which deserve at least some credit for their custom of blooming a second time in the fall.

His emphasis of substance also seems a bit unwise. I might too easily rate Ambassadeur below 80% in this point alone and I really do not like Dr. Bernice quite as well, worthy as it is.

It seems to me that our common mistake is not so much in our methods of scoring as it is as in making up our minds in advance that every iris we like must rate over 80%. We must either come to an appreciation of varieties rating nearer 70% or else give our favorites added value as of possessing outstanding quality of some sort. From one of the first definitions of outstanding quality as a score card term (Bulletin 2, page 37) I might quote as follows: "It is an all inclusive term—almost anything you will that marks the variety as worth having." With such a ruling Mr. Gersdorff might well rate Dr. Berenice at over 80 even with the present score card.

From Mr. Weed, Oregon. "We have had a severe winter and I thought at one time that all my Japs. had gone but they are now showing in fine shape so that I am already looking forward to their bloom. Some new irises, for me, are the Palestines which I am cataloguing for the first time."

"Roof" Irises. The discussion of what irises were grown on roofs abroad has brought a number of comments via Mrs. Durrand, Mrs. Peckham, and Mr. Leonard Barron.

M. Truffaut writes from 25 Avenue Victoria, Paris: "These irises are, usually, pumilas (either the type or one of its varieties) and sometimes they cultivate also the germanicas under the same conditions."

In The Genus Iris I also found a note under I. germanica stating that it was occasionally grown on the thatched roofs of Normandy and Brittany.

Errata. On page 9 of the April Bulletin Mr. Meade intended to recommend Sonata, Avatar, and Rhea as a most delightful combination.

Duration of Bloom. J. Marion Shull.

Dear Mr. Sturtevant:

It isn't often that I have had to disappoint you in regard to Iris but I'm afraid there is nothing I can do in this case. And the worst of it is that the inquiry is a quite pertinent one and the information asked would be well worth having recorded somewhere. In my own very limited garden it is not possible to maintain the large collection on which data would be expected, and while I have perhaps twice as many varieties in the garden as were included in my report it is obviously unfair to include those varieties in which only a stem or two are represented. Such comparisons need to be made on a minimum of several stems, preferably five or more of each variety included, and to be carried for more than a single search, the larger number the better so that averages may be reasonably accurate. Such records can only be kept in the garden you live with day by day throughout the blooming season for it is absolutely necessary that a record of all varieties be made daily, just as you would keep the roll of a bunch of school children. I shall probably continue to keep such a record of my own garden but this year's record would add very few new names to the list I have published and would serve very little but to confirm and stabilize further the graph as shown.

You will see by this that the work would have to be done by someone with a well established large collection of the more desirable sorts, that it would need to be carried on at least two years and preferably longer for the sake of accuracy. The test gardens would be in a good position to do this with regard to the older varieties but are apt to be short on the newer things so I hardly know what to suggest. If someone in a position to keep such notes accurately would undertake it I would be glad to correlate the notes afterward and produce the graph to use in publication, but my abbreviated and lopsided collection does not make it possible here.

I regret very much not being able to meet Mrs. Townsend's need and I do not know of anyone else who has been keeping such a record. As to standing heat I doubt if there is a very great difference in varieties and naturally all late bloomers are subject to possible extra hot days. I have seen Ambassadeur with all its fine substance absolutely ruined by heat by evening of the same day it opened but luckily such visitations are not to be expected every year.

ALPHABETICAL IRIS CHECK LIST, 1929

This important book will be published by the American Iris Society as of date June 1st, 1929. Notice has already been given of the fact that owing to the great expense necessary to the printing of such a technical work it will not be distributed free to Members. However, Members will always have the privilege of obtaining it at a lower price than outsiders can and the prices have now been decided upon.

The book will be in permanent form with substantial cover and the same height and width as our BULLETINS, so that, if they should be bound, all could stand together easily on the same shelf.

While a sum has been set aside from the funds of the Society towards the publication of the Check List, it is not sufficient and we hope that the sale of the book to reference libraries, nurseries, seedsmen, students, teachers, amateur and professional gardeners and Iris enthusiasts in general will cover the remainder. Members can help this project by asking the public libraries in their vicinity to buy it and also by bringing it to the attention of teachers of horticulture and of horticulturists generally. It would be of great use to a Garden Club if they would see that a copy is in the reference-room of the library in their town.

Cheques and money orders should be made out to The American Iris Society and mailed to John B. Wallace, Jr., Secy., 129 Church Street, New Haven, Conn. To Members, $2.00; Non-members, $3.00.

American Iris Society Test Gardens

Who and Where They Are—What They Need

Brooklyn Botanic Garden, 1000 Washington Ave., Brooklyn, N. Y. Dr. Geo. M. Reed in charge. Test Garden for Beardless Irises making a special study of Japanese varieties. Pests and diseases, Beardless Irises studied here. New Japanese, New Siberian, Beardless species, Oncocyclus and Regelia varieties required. Communication in regard to Beardless varieties invited.

California Botanic Garden, Sawtelle, Calif. Prof. Frederic W. Taylor in charge. Dr. S. S. Berry, 1145 W. Highland Ave., Redlands, Calif., supervising Iris collection, will be glad if lists of available varieties are submitted to him, also to reply to questions as to what is needed. Many varieties, covering all sections desired as this is the opportunity to test unusual sorts that cannot be tried in Eastern Test Gardens.

Cornell University, Dept. of Floriculture, Ithaca, N. Y. Mr. Alfred M. S. Pridham in charge. General Test Garden. Large collection standard varieties needing all newer varieties including bulbous. Dwarf Bearded test being made by Dr. Albert H. Wright. Two plants of each of these should be sent to him that they can be studied in the two plots.

Iowa State College of Agriculture and Mechanic Arts, Ames, Iowa. Prof. E. C. Volz in charge. General Test Garden having standard varieties. Needs Beardless, Japanese and Dwarf Bearded, also all new varieties.

Missouri Botanical Garden, St. Louis, Mo. Mr. P. A. Kron in charge. General Test Garden desiring all new varieties, Bearded or Beardless and species to complete collection and provide material for various tests.

Minnesota, University of. Mr. F. X. Schreiner, Route 1, Riverview Sta., St. Paul, Minn., in charge. Varieties of Bearded, Beardless, species and bulbous. All needed for study.

Morton Arboretum, Lisle, DuPage Co., Ill. Mr. Godshalk in charge. General Test Garden for all kinds of Bearded, Beardless, species. Many duplicates needed as several gardens are being laid out for display and study. All standard and new sorts welcome.

New York Botanical Garden, Bronx Park, New York, N. Y. Mr. Kenneth M. Boynton in charge. **Test Garden for Bearded varieties.** Trial Garden for seedlings. Breeding Garden for species under direction of Dr. A. B. Stout. Dr. J. K. Small is testing and describing new species collected by him. New varieties of Bearded needed. Seedlings sent in should be marked "Seedlings for Trial."

Saskatchewan, University of, Saskatoon, Saskatchewan, Canada. Prof. C. F. Patterson in charge. Glad to receive any newer varieties to test hardiness in that climate. Particularly desirous of American seedlings to test value in Canada. Senders should write first to Prof. Patterson who will get permit for specified number of plants.

NOTICE—REGISTRATIONS

It has been the custom of the American Iris Society to register Iris names until October 31st of any given year, after which the list has been printed in the BULLETIN of the January following. The publication in the January BULLETIN of a list totalling the Registration for the year preceding will continue, but Registrations will be published in the horticultural press as quickly after they have been approved as is possible and the month and year in which they were registered will be given. This method should bring the new names before breeders and growers much more quickly and keep them conversant with this side of Iris affairs. It should help them, too, in that they will not submit so many names that are already in use. Because of an arrangement with the Iris Society (England) names will be passed on by both Societies before finally registered. To allow time for this, the **date for closing** the American registrations each year must be advanced to August 31st. So, notice is hereby given to American breeders and growers to send in their names before that date.

In submitting names it is advisable to send several choices marked as first and second, etc. As there are over eight thousand names in the new Check List it can readily be seen that it is easy to pick a name that cannot be approved!

One rule for Registration is that no name which has been used before will be approved and only one name will be allowed including all the sections so that there will not be a Bulbous sort with the same name as a Tall Bearded unless, of course, it is a synonym.

Another rule is that names *must* be submitted to the Registrar and not just handed in to some other Officer of the Society with the expectation that he will see they reach the right place. The Secretary will try to forward communications to the person best able to answer queries, but anything so important as registration must be bound by set rules of procedure.

A third rule is that a full description which includes parentage (if possible), color, type, section, etc., etc., must accompany the application. The applicant should say also if the seedling has already been introduced and when and by whom (giving full address) and he or she should, if registering for the first time, also give some slight biographical details about themselves, such as whether an amateur, nurseryman, etc., that the files of the Society may be kept up to date and that when a supplement to the Check List is about to be published, much research will not have to be resorted to.

No person other than the originator may register a seedling unless permission to make such registration has been granted by the originator and notice of such permission must be sent to the chairman of the registration committee at the time such registration is made.

NOTICE

Details of the $100.00 Prize offered by Robert Wayman will be found on page 40 of BULLETIN No. 15.

Publications available from Science Press Printing Co., Lancaster, Pa. Checks payable to American Iris Society.

Bulletins

No. 1. June, 1920. The Culture of Irises in the United States. 32 pp. Out of print.

No. 2. January, 1921. Garden Irises, Past and Present. 44 pp. The Development of Tall Bearded Irises in the 19th Century. Sir Michael Foster and his Irises. Registration and notes on hybridization and garden effects. $1.00.

No. 3. June, 1921. Sir Michael Foster and his Work. 32 pp. Illustrated. Out of print.

No. 4. January, 1922. 34 pp. Check List (superseded by No. 8). Free on application.

No. 5. May, 1922. Symposium. 32 pp. Numerical ratings of some 700 varieties which are a most valuable guide to the relative value of standard varieties. 50 cents.

No. 6. October, 1922. Description of Varieties, Part I. 40 pp. Notes on European Irises (see also Nos. 7, 9 and 12). $1.00.

No. 7. January, 1923. Descriptions of Varieties, Part II. 40 pp. Articles by A. J. Bliss, W. J. Caparne, and J. M. Shull. $1.00.

No. 8. October, 1923. Check List, October, 1923. 40 pp. This, together with a supplement and lists of registrations in Nos. 14, 18, and 22, gives the authoritative list of all Iris names. Supply nearly exhausted. 50 cents.

No. 9. December, 1923. A review of the Irises raised by William Mohr. 46 pp. Ill. A detailed review of bulbous Irises and their culture. Descriptions, Part III. $1.00.

No. 10. January, 1924. Irises for the Beginner. 60 pp. Ill. A comprehensive treatment of all Irises adapted to the small garden, with recommended lists of varieties, garden and cultural notes. The Directors consider this BULLETIN worthy of a special edition and a copy is given *free to all new members*. You may well advise your gardening friends to purchase it. On sale to non-members at 50 cents.

No. 11. May, 1924. Beardless Irises. 40 pp. Ill. A complete and compact review of the species and varieties of this group of the Iris family. The articles by W. R. Dykes are of especial interest. $1.00.

No. 12. October, 1924. Notes and Descriptions, Part IV. 40 pp. Ill. This brings the list of descriptions up to about five hundred of the finest varieties. $1.00.

No. 13. December, 1924. A Classification of Bearded Irises. 36 pp. The first published color classification of the group and a valuable reference. 50 cents.

No. 14. January, 1925. Bertrand H. Farr. 68 pp. Ill. The man and his work with Irises. Official records of the Society, 1920–1925, including the Code of Nomenclature, a 1924 Bibliography of Iris Literature, the White and Black lists of varieties. $1.00.

No. 15. April, 1925. Irises of the Future. 40 pp. Ill. Articles by Sydney B. Mitchell, B. Y. Morrison, Sherman Duffy, and others. Trial garden reports and records. 50 cents.

No. 16. July, 1925. A Report on Sterility in Irises. 44 pp. Ill. The first scientific study of the subject and the result of research at the New York Botanical Garden. The American Iris Society has been the first popular flower society to initiate and support scientific research. This BULLETIN is not recommended to the casual reader. Supply limited. 50 cents.

No. 17. October, 1925. Japanese Irises and Others. 44 pp. Ill. Prof. Miyazawa speaks of his iris work, M. Denis writes of White Irises, and others tell of their successes. It is an unusually chatty issue. 50 cents.

No. 18. January, 1926. 48 pp. Reports of Officers and of Trial Gardens, Text of Display Garden Agreement. 1925 Bibliography. 1925 Introductions and Registrations. Extracts from Les Iris dans les Jardins, by M. Correvon. $1.00.

No. 19. April, 1926. W. R. Dykes. 40 pp. Ill. Dedicated to the memory of W. R. Dykes, a most interesting and permanent record of a life's work with irises. It includes the most valuable of his occasional writings. Further technical notes on sterility. 50 cents.

No. 20. July, 1926. The Iris of Gerard's Herbal. 32 pp. Illustrated from the original. Iris combinations for the garden. Reports of 1926 exhibitions. 50 cents.

No. 21. October, 1926. Planting an Iris Garden. 44 pp. Ill. Further Studies in Sterility. Iris flavissima and many odd notes from England and America. Supply limited. 50 cents.

No. 22. January, 1927. Exhibition Policy. 60 pp. Ill. 1926 Society Records. 1926 Bibliography. 1926 Introductions and Registrations. Further Sterility Studies. $1.00.

No. 23. April, 1927. Memoriam, Arthur H. Scott. 48 pp. Ill. The value of Iris breeding by S. B. Mitchell. Is scientific research necessary? 1926 Test Garden reports, from the New York Botanical Garden, Brooklyn Botanic Garden, Cornell University, Missouri Botanic Garden. Regelia and Onocyclus Iris. Book reviews. 50 cents.

No. 24. July, 1927. 40 pp. European Iris notes. Reports of 1927 exhibitions. Regelio-Cyclus Irises in Canada. Book reviews. 50 cents.

No. 25. October, 1927. Early Dwarf Bearded Iris. 40 pp. Early flowering species and varieties and their use in the garden. List of Hybrid Iris of W. J. Caparne. Old Iris names. Discussion of the problems of the Iris breeder. 50 cents.

No. 26. January, 1928. 1927 Reports. 68 pp. Charter and By-laws. Science Series No. 1, The Iris Borer. Irises in California, England, and Italy. The Questionnaire—facts of Interest. 50 cents.

No. 27. April, 1928. 64 pp. Garden Reports. The Test Gardens and their Work. Science Series 2, Breeding. Flowering Periods, Prices, and Gardens. Writings of Sir Michael Foster. Book Reviews. 50 cents.

No. 28. July, 1928. 64 pp. An Up-to-the-minute rating of hundreds of varieties, thus supplanting No. 5. The Japanese Iris .(illustrated). Plans. $1.00.

No. 29. October, 1928. 68 pp. Garden Irises and Garden Plans. Science Series 3, Chromosomes—Root Growth. 1928 Exhibitions. Notes From Afar. Descriptions, Part V, and Index to all varieties described. $1.00.

Please note the BULLETINS No. 1 and No. 3 are out of print.

For the convenience of members who have joined during the past five years and who wish to complete their sets, the following BULLETINS are offered in sets at reduced prices.

Set A.	All bulletins, 1921–1923, inclusive, Nos. 2, 4– 9, inclusive.	$ 5.00.
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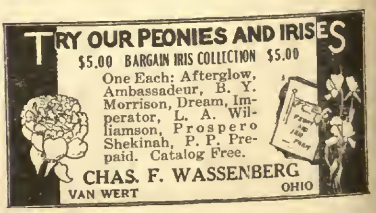
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American Iris Society Bulletin

R. S. STURTEVANT, Editor

GROTON, MASS.

Published in the interest of Iris Growers

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* From Bulletin 15, page 40.